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A review of important forest insect and disease problems in the SUDBURY DISTRICT of Ontario, 1950 - 1980

Compiled by

H. J. Weir, M. J. Thomson,
D. C. Constable and C. G. Jones

Miscellaneous Report No. 12

Canada

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THE GREAT LAKES FOREST RESEARCH CENTRE

The Great Lakes Forest Research Centre is one of six regional establishments located across Canada and operated by the Canadian Forestry Service. The overall objective of the Service is to promote the preservation, enhancement and wise use of a healthy, attractive and bountiful forest resource and terrestrial environment for the economic and social benefit of all Canadians. The Centre pursues this objective by conducting two major programs: research and technical services and forestry development. Both programs address major problems affecting forest management and the forest environment primarily in Ontario, but because of the transprovincial nature of the forest resource, many elements of our research program are of national significance.

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The Centre recognizes that forested land must be managed in the best public interest, not only for the wood production essential to our economy but also for the recreational purposes that are so important to our social well-being. These goals must be achieved in a manner that will maintain or improve the quality of the forest environment and preserve it for generations to come.

A REVIEW OF IMPORTANT FOREST INSECT AND DISEASE PROBLEMS IN THE SUDBURY DISTRICT OF ONTARIO, 1950-1980

Compiled by

H.J. Weir, M.J. Thomson, D.C. Constable and C.G. Jones[1]

GREAT LAKES FOREST RESEARCH CENTRE
CANADIAN FORESTRY SERVICE
DEPARTMENT OF THE ENVIRONMENT
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[1] *Forest Research Technicians, Forest Insect and Disease Survey Unit*

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FOREWORD

The first forest insect surveys in Ontario were carried out in 1936 from the Dominion Entomological Laboratory in Ottawa and continued from this location until 1944, when the province of Ontario was divided, for the purpose of these surveys, into northern and southern Ontario. In 1945, personnel from Ottawa continued to conduct and report on surveys in the area south of the Algonquin Park and Parry Sound forest districts, while personnel from the Forest Insect Laboratory in Sault Ste. Marie carried out surveys in the area to the north. In 1950 responsibility for reporting insects for all of Ontario fell to the Sault Ste. Marie laboratory. In 1952 the Forest Disease Survey was initiated with headquarters in Maple, Ontario, then was moved to Sault Ste. Marie in 1967. The results of these surveys of insects and diseases are reported in the Annual Report of the Forest Insect and Disease Survey (FIDS) published by Canadian Forestry Service headquarters in Ottawa. In addition, annual district and regional reports, begun in 1948, are prepared by FIDS technicians (Rangers) in Sault Ste. Marie. In 1980 a new provincial report was released in Ontario. The contents of the following review have been abstracted from these reports and compiled in alphabetical order by the scientific names of species in each of the following three categories:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects or Diseases

Capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs.

Abiotic Damage

Damage caused by non-living factors.

All measurements in this review are in metric form and conversions from Imperial measurements from the earliest reports are taken to the second decimal point, i.e., [sq. mi. to km^2 = area (sq. mi.) x 2.59 = area km^2]. Infestation maps in this review were copied from the original maps in the FIDS technicians' reports. Abbreviations for the common names of the host tree species, along with the scientific names, are shown in Appendices A and B. To facilitate the location of hosts, deciduous and coniferous species have been separated and listed alphabetically under the common names.

Appendix C is a series of maps for northeastern Ontario grouped alphabetically by insect species or disease pathogen and showing the location of infestations within a region or infestation boundaries that extend beyond regions.

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We also wish to acknowledge the following authors of the annual FIDS district and regional reports from which the review was abstracted:

1950	J.M. Bussineau, K.C. Hall, F.A. Bricault, J.E. MacDonald
1951	J.M. Bussineau, K.C. Hall, W.A. Sillers, J.E. MacDonald
1952	E.O. Clinton, C. Vaillancourt, W.R. Sillers
1953	E.O. Clinton, C. Vaillancourt, H.G. McPhee
1954	E.O. Clinton, C. Vaillancourt, R.L. Bowser
1955-1956	E.O. Clinton, C.A. Barnes, R.L. Bowser
1957-1958	J.R. McPhee, R.L. Bowser, C.A. Barnes
1959	J.R. McPhee, J.R. Trinnell, D.G. Grisdale
1960-1961	J.R. McPhee, F. Livesey, J.R. Trinnell
1962-1964	J.R. McPhee, F. Livesey, R.A. Trieselmann
1965	J.R. McPhee, D. Ropke, R.A. Trieselmann
1966	J.R. McPhee, D. Ropke, W. Ingram
1967	G.W. Cameron, D. Ropke, W. Ingram
1968-1969	E.L. Houser, W. Ingram
1970-1973	E.L. Houser, F. Livesey
1974-1977	W.D. Biggs, K.C. Hall
1978-1980	H. Brodersen, K.C. Hall

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INTRODUCTION

This report is a review of significant forest insects and diseases that have occurred in the Sudbury District during the period 1950 to 1980, with a brief summary of outbreaks prior to 1950. The Sudbury District has undergone a number of boundary changes since 1950. The most significant of these occurred in 1968 when a large portion of the Gogama District was added to the northern Sudbury District and in 1973 when the western Sudbury District, including Manitoulin Island, was separated to form the Espanola District and the northern Sudbury District was transferred back to the Gogama District. In the selection of pests for this report, particular attention was paid to the major working groups of host species in the area, namely hardwoods (poplar, sugar maple, yellow and white birch) and conifers (white, jack and red pine, balsam fir, black and white spruce, and tamarack). Also included are pests that cause damage to shade and ornamental trees. The insects and diseases described are capable of causing, or have caused, tree mortality or a reduction in growth. Also included are abiotic conditions that have caused tree damage, i.e., frost, wind, snow and hail.

SUMMARY

FOREST INSECTS

Birch Skeletonizer, *Bucculatrix canadensisella* Clem.
pages 11 - 16 [Major]

Defoliation by this insect seldom causes mortality of the host but weakened trees are subject to attack by secondary insects and diseases. Large outbreaks of this insect usually last 3 to 4 years, then decline rapidly. Severe infestations have been recorded in 1949, 1950, 1961, 1962 and from 1971 to 1973.

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)
pages 17 - 26 [Major]

No tree mortality has been recorded as caused by this defoliator, which affects primarily aspen and poplar. Infestations were reported from 1957 to 1959 and from 1971 to 1973. Prior to 1957, the insect was not reported.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)
pages 27 - 50 [Major]

This insect is considered the most destructive insect pest of several coniferous hosts in eastern Canada, the main hosts being white spruce and balsam fir. Though not major hosts, black spruce, eastern hemlock, and tamarack are attacked and considerable tree mortality can occur. Low populations were recorded from 1961 to 1965, and severe defoliation started in 1966 and continued through to 1980. Balsam fir mortality was first noted in 1972 in the Rome Lake vicinity. Infestations were reported as early as 1937.

Jack Pine Budworm, *Choristoneura pinus pinus* Free. [Major]
pages 51 - 58

This is a destructive pest of pines that can cause mortality after about two years of severe defoliation. From 1965 to 1971 light-to-moderate infestations persisted in the district.

From 1972 to 1980 populations have occurred in small numbers. Light tree mortality was reported in 1970.

Larch Casebearer, *Coleophora laricella* Hbn. [Major]
page 59

A serious pest of both native and European larch, this insect can cause reduced tree growth and tree mortality after two successive years of complete defoliation. Low populations have occurred over the past 30 years, with no host damage reported.

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.) [Major]
pages 59-64

This insect defoliates both red maple and sugar maple but prefers red maple understory trees. Small, scattered pockets of severe defoliation were reported from 1954 to 1956, in 1971, then in 1973 and 1974. Although no mortality has occurred in the district, serious injury can follow after several years of defoliation.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr. [Major]
page 65

This insect usually infests lateral shoots and causes only aesthetic damage. When high populations develop, some leaders are infested and killed causing deformity of infested trees. Since 1950, populations have remained low and little damage has been observed.

Birch Leafminer, *Fenusa pusilla* (Lep.) [Major]
pages 65 - 67

Defoliation by this miner can weaken trees and leave them susceptible to secondary insects and diseases, and may be a predisposing factor in birch decline. As a rule these insects attack single trees, but when populations build up, stands of trees are severely defoliated. Populations have fluctuated since first being reported in 1954.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. [Major]
pages 67 - 93

The earliest recorded outbreak in the district occurred in the Wanapitei Lake area in 1939 and continued until 1942. Severe defoliation was again observed from 1950 to 1954, from 1960 to 1963, and from 1973 to 1980 at various points in the district.

Balsam Fir Sawfly, *Neodiprion abietis* complex [Major]
page 94

Severe defoliation can cause mortality of balsam fir and white spruce trees when an infestation persists over a period of years. In 1952, one small pocket of severe defoliation was reported in Fairbank Twp. However, during the last 30 years only endemic populations have been recorded.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) [Major]
pages 94 - 95

This destructive pest of pine plantations can cause mortality after several years of severe defoliation. The preferred hosts are Scots pine, red pine and jack pine planted in pure stands. In 1955 and 1967 severe defoliation occurred in plantings at the Burwash Industrial Farm. With the exception of the years mentioned above, low populations have been recorded.

Swaine Jack Pine Sawfly, *Neodiprion swainei* Middleton [Major]
pages 95 - 97

The Swaine jack pine sawfly is the most destructive sawfly on jack pine in eastern Canada. It has killed thousands of hectares of merchantable trees between the 46th and 49th parallels, mostly in Quebec but also in northeastern Ontario. Light infestations were reported in 1947 in the Onaping Lake area. During the period from 1950 to 1980 population levels have been light.

Pine Sawflies, Jack Pine Sawfly, *Neodiprion pratti banksianae* Roh.,
Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.,
Redheaded Jack Pine Sawfly, *Neodiprion virginianus* complex [Major]
pages 97 - 100

The sawflies listed are capable of causing mortality of semimature and plantation pine trees when populations are high. From 1950 to 1980 populations fluctuated considerably. No mortality has been recorded to date for any of the species listed.

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) [Major]
pages 100 - 101

Although this insect has not been known to cause tree mortality, severe browning of foliage over a period of years can cause a reduction in growth. Varying degrees of infestation were noted for most years since the insect was recorded in 1951.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) [Major]
pages 102 - 103

This destructive insect has been categorized as a serious pest of young spruce plantations and open-growing ornamentals. High mortality can occur after successive years of severe defoliation. The insect was first reported in the Sudbury District in 1947.

White Pine Weevil, *Pissodes strobi* (Peck.) [Major]
pages 103 - 104

This weevil is considered the most destructive pest of white pine in North America. Successive weeviling over a period of years results in multiple-stemmed trees. Populations were generally low from 1952 to 1980.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) [Major]
pages 104 - 113

The larch sawfly is the primary defoliating insect of native and most exotic species of larch. On good sites, larch trees can withstand six to nine years of severe defoliation before mortality occurs; on less favorable sites, mortality may follow three or more years of complete defoliation. The insect was first reported in 1937. Severe defoliation was recorded from 1954 to 1958 but since 1958 populations have remained low.

Other Noteworthy Insects [Major and Minor]
pages 114 - 128

Insects that have the potential for causing damage to stands, regeneration and plantations.

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.) Kumm. [Major]
page 131

This root rot disease often kills trees previously stressed by drought, insects, other pathogens or unfavorable environment. However, under some circumstances the fungus, or certain strains of the fungus, can kill vigorous trees. Both deciduous and coniferous trees are attacked. The fungus was reported at low levels periodically from 1958 to 1980.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau [Major]
pages 131 - 132

This major disease organism, which affects all species of elm, was first recorded in Ontario in Prescott County in 1946, and has gradually spread throughout most of the known range of elm in Ontario. The disease was first observed in Scollard Township in 1966.

Needle Rusts, *Chrysomyxa ledi* (Alb. & Schw.) d By [Major]
C. ledicola Lagh.
pages 132 - 133

These, the most widely spread rusts in the Canadian boreal forest, are a concern on mature trees, but the potential for damage in nurseries can be high. Infection and damage levels from 1950 to 1980 were insignificant.

Ink Spot, *Ciborinia whetzelii* (Seaver) Seaver [Major]
page 134

This ink spot disease is widespread throughout the range of aspen. Many poplar species and hybrids are susceptible, but trembling aspen is most commonly affected. Heavily infected trees may be defoliated prematurely and repeated attacks can reduce increment and even kill regeneration. Fluctuating levels of defoliation have been reported for most years since 1958.

White Pine Blister Rust, *Cronartium ribicola* J.C. Fisch. [Major]
page 135

White pine blister rust is the most serious disease of eastern white pine. The disease causes top killing and mortality in trees of all ages. Although no mortality was reported, varying degrees of damage were noted over the years recorded.

Hypoxylon Canker, *Hypoxylon mammatum* (Wahl.) J.H. Miller [Major]
page 136

Mortality caused by this disease is usually restricted to trees in the 7-cm to 13-cm class, growing on poor sites, but branch and top mortality may occur in trees of greater diameter. Varying degrees of infection have been reported at numerous locations since 1954.

Shoot Blight, *Venturia macularis* (Fr.) Müller & Arx. [Major]
page 137

Reduced stocking of regeneration aspen occurs when the incidence of this disease is high. Trees more than 5 years old are seldom affected and therefore the disease is of little economic importance in natural stands. Varying levels of shoot mortality have been noted since this disease was first reported in 1960.

Rusts of Pine, Sweet-fern Blister Rust, *Cronartium comptoniae* Arth.
Eastern Gall Rust, *Cronartium quercuum* (Berk.) Miy. ex
Shirai, Globose Gall Rust, *Endocronartium harknessii*
(J.P. Moore) Y. Hirat.
pages 138 - 139 [Major]

These rusts may kill trees outright or make them more susceptible to insects, decay, and wind breakage depending on the degree of infection. Since 1954, varying degrees of infection have occurred and damage has been minimal.

Other Noteworthy Diseases
pages 140 - 143

These are diseases with the potential for causing damage to natural stands, regeneration and plantations.

ABIOTIC DAMAGE

pages 147 - 149

Abiotic damage is caused by a variety of influences, i.e., frost, winter drying, salt, etc. Weakened trees are susceptible to a number of diseases. Severe abiotic damage has been reported periodically since 1959.

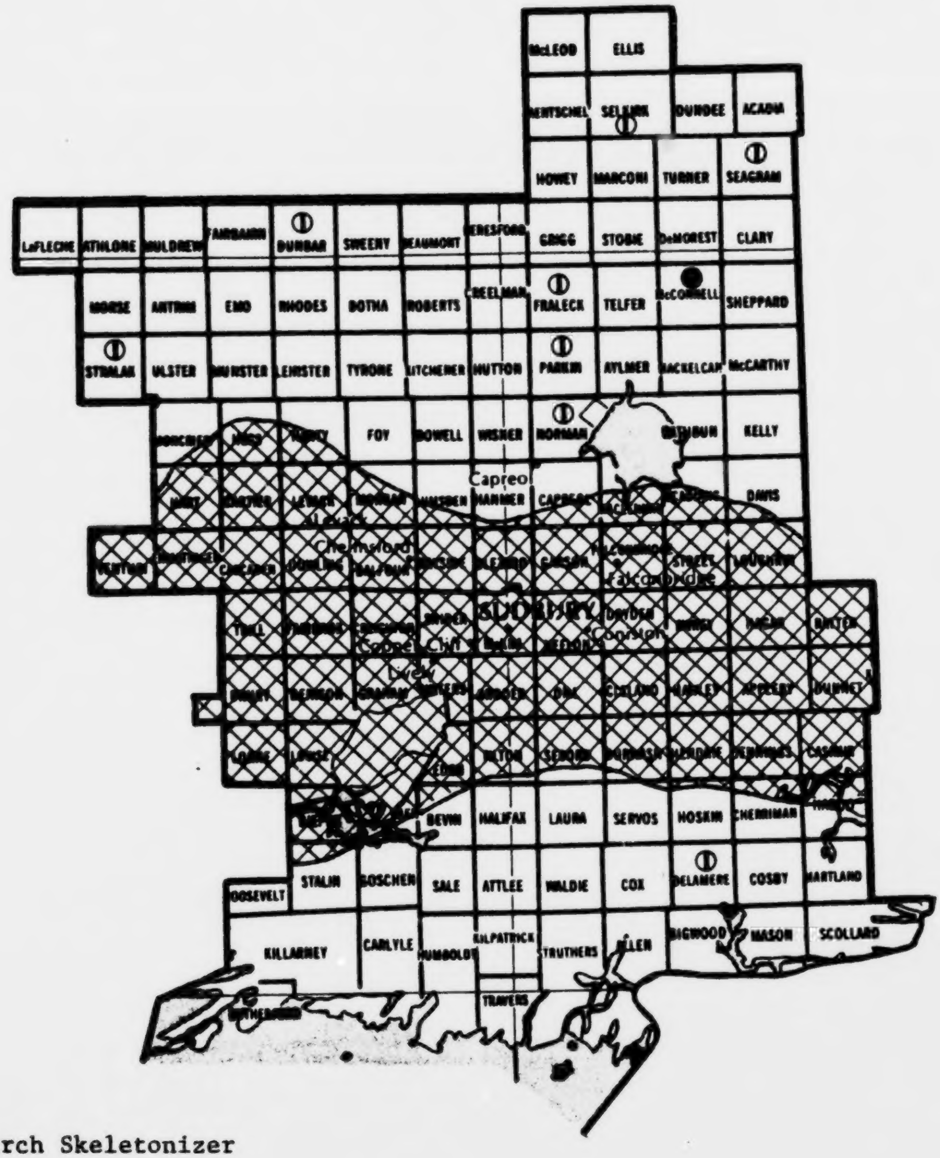
INSECTS

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): birch [Major]

Year	Remarks
1950	A heavy infestation occurred along a 45-km-wide strip, running east to west through the district, as far north as Lake Wanapitei and south to Burwash Twp (see map, page 12).
1951-1959	not reported
1960	light infestation on lakeshore trees in Onaping Twp
1961	moderate-to-severe defoliation from Trill Twp east to Ratter Twp, including most areas south of this line (see map, page 13)
1962	moderate-to-severe defoliation east and south of the city of Sudbury where total skeletonizing caused leaves to drop prematurely.
1963	The moderate-to-severe infestation reported in the southern half of the district in 1962 declined sharply in 1963. Pockets of varying degrees of damage were common throughout the district.
1964	A further decine in infestations of this skeletonizer occurred, especially in the northern portion of the district. The only exception was around the city of Sudbury where trees were heavily attacked.
1965	light defoliation in the city of Sudbury and around Onaping Lake
1966-1969	not reported
1970	endemic populations
1971	large area of moderate-to-severe defoliation in the Trout Lake and French River areas (see map, page 14)
1972	Populations and total area affected showed major increases in the southern portion of the district and as far north as Lake Wanapitei (see map, page 15).
1973	Moderate-to-severe defoliation persisted in the southern part of the district. Elsewhere light defoliation was evident except in the northwestern part (see map, page 16).
1974-1980	not reported

SUDBURY DISTRICT



Birch Skeletonizer

Areas within which defoliation occurred in 1950

LEGEND

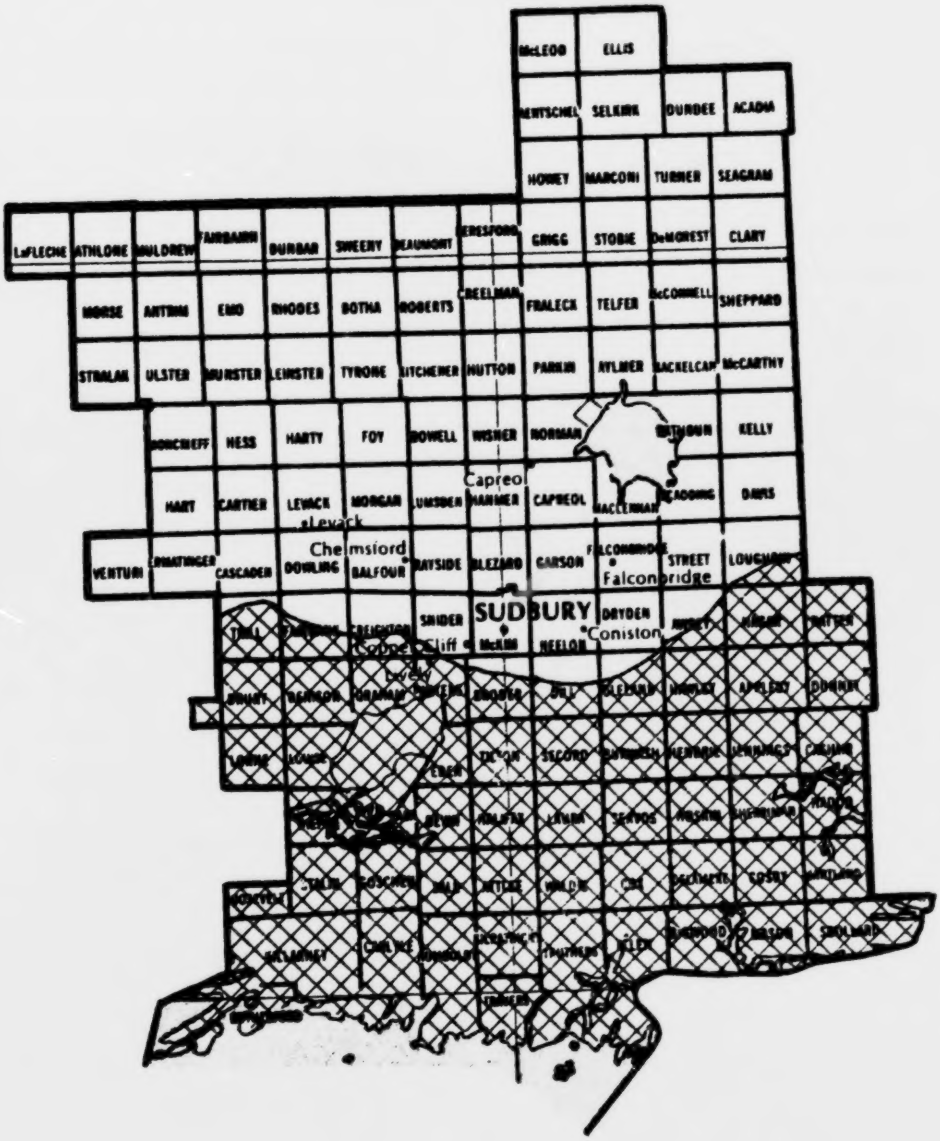
Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Birch Skeletonizer 1961

Areas within which defoliation occurred in 1961

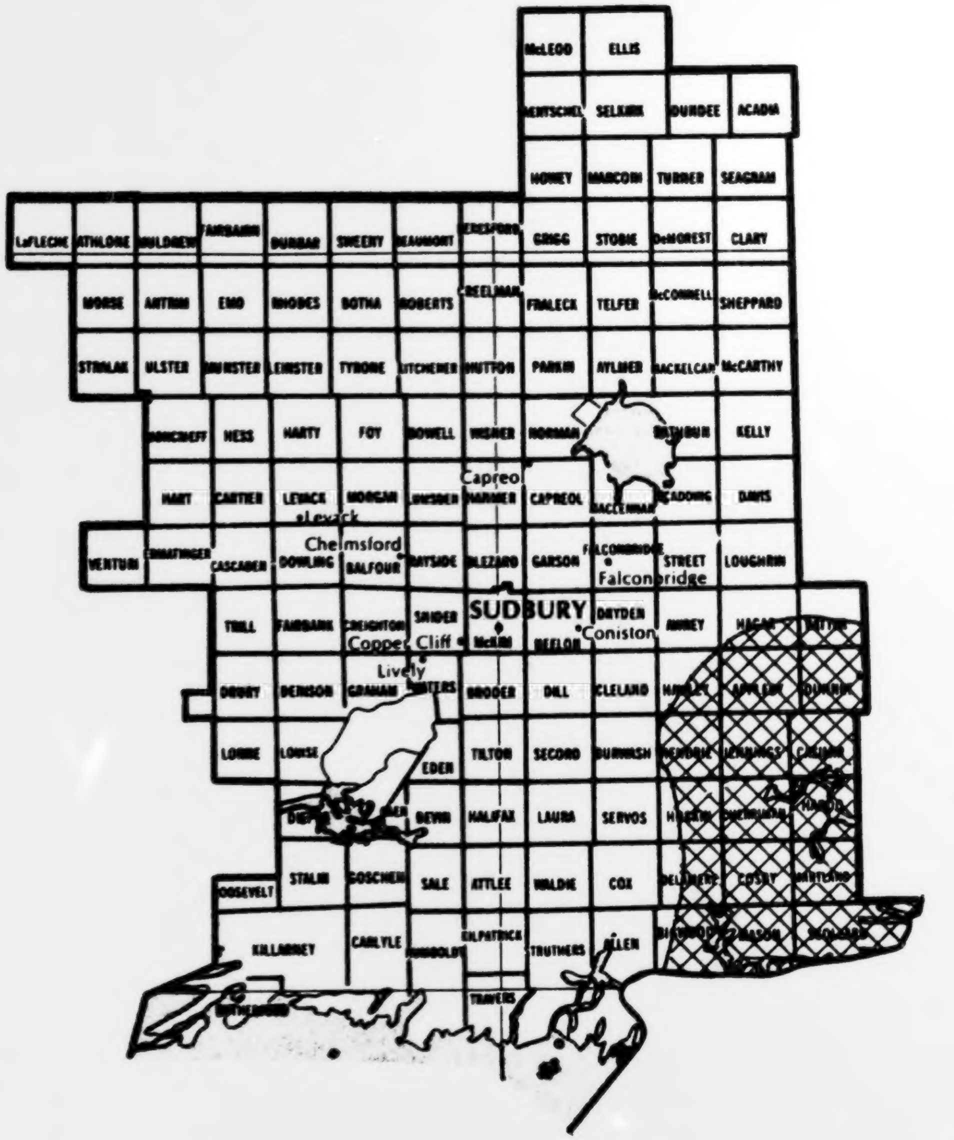
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Birch Skeletonizer

Areas within which defoliation occurred in 1971

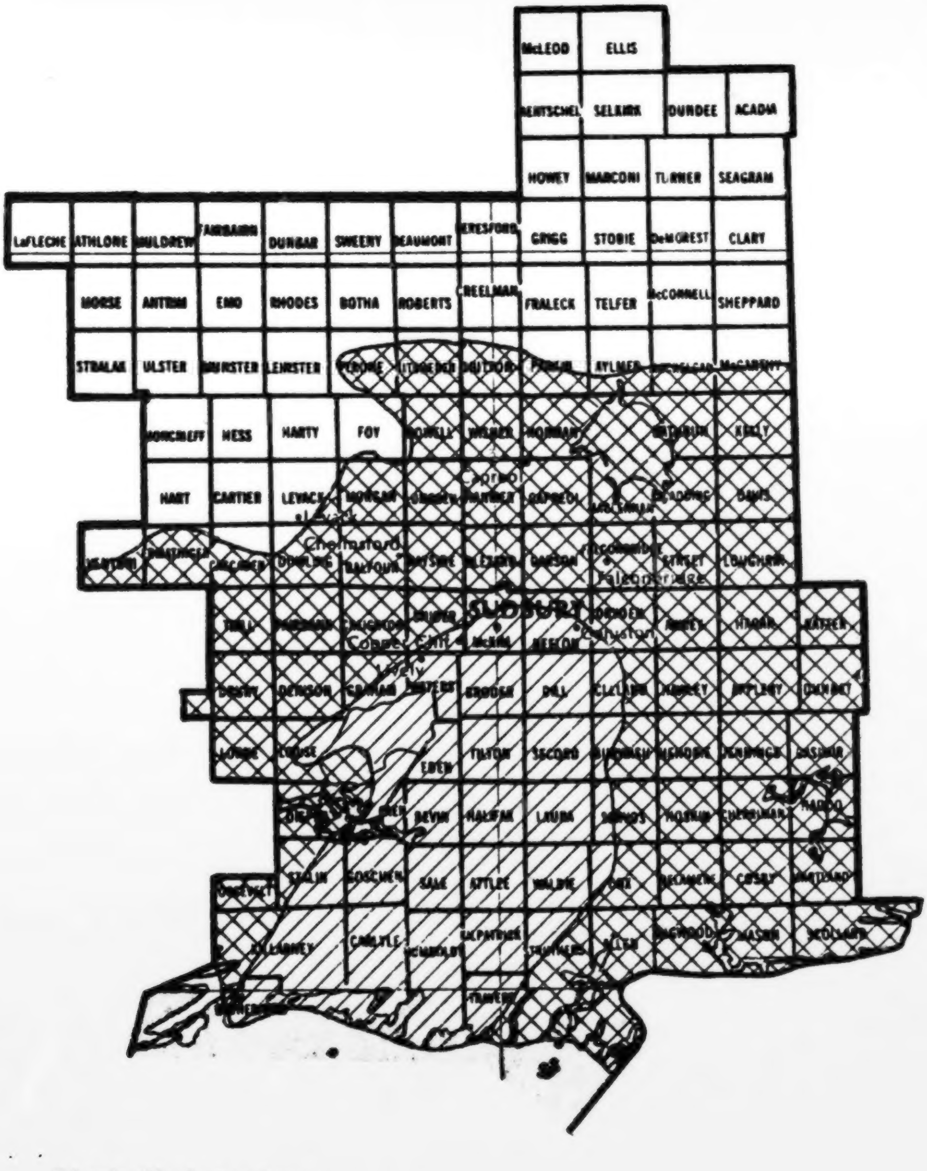
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Kilometres 20 10 0 20

Scale

Birch Skeletonizer

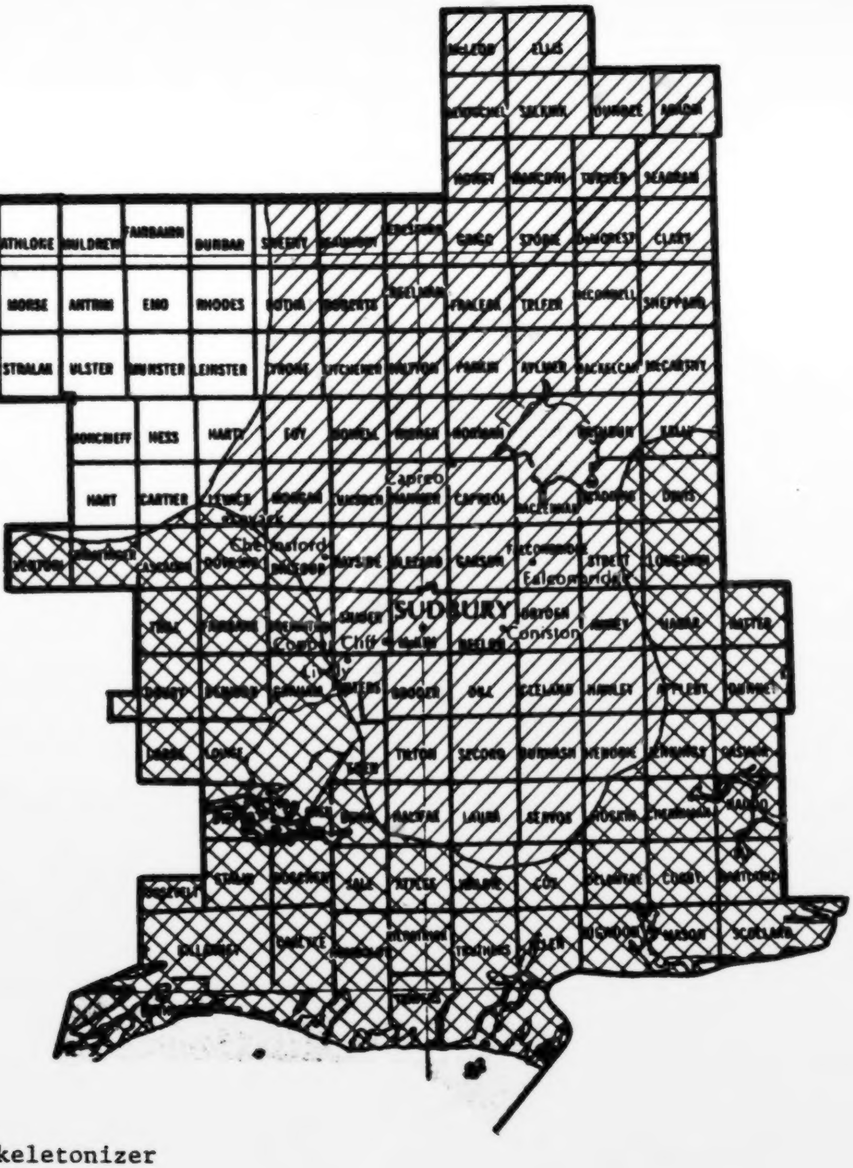
Areas within which defoliation occurred in 1972

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

SUDBURY DISTRICT



Birch Skeletonizer

Areas within which defoliation
occurred in 1973

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

Scale

Kilometres 20 10 0 20

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)

[Major]

Host(s): tA

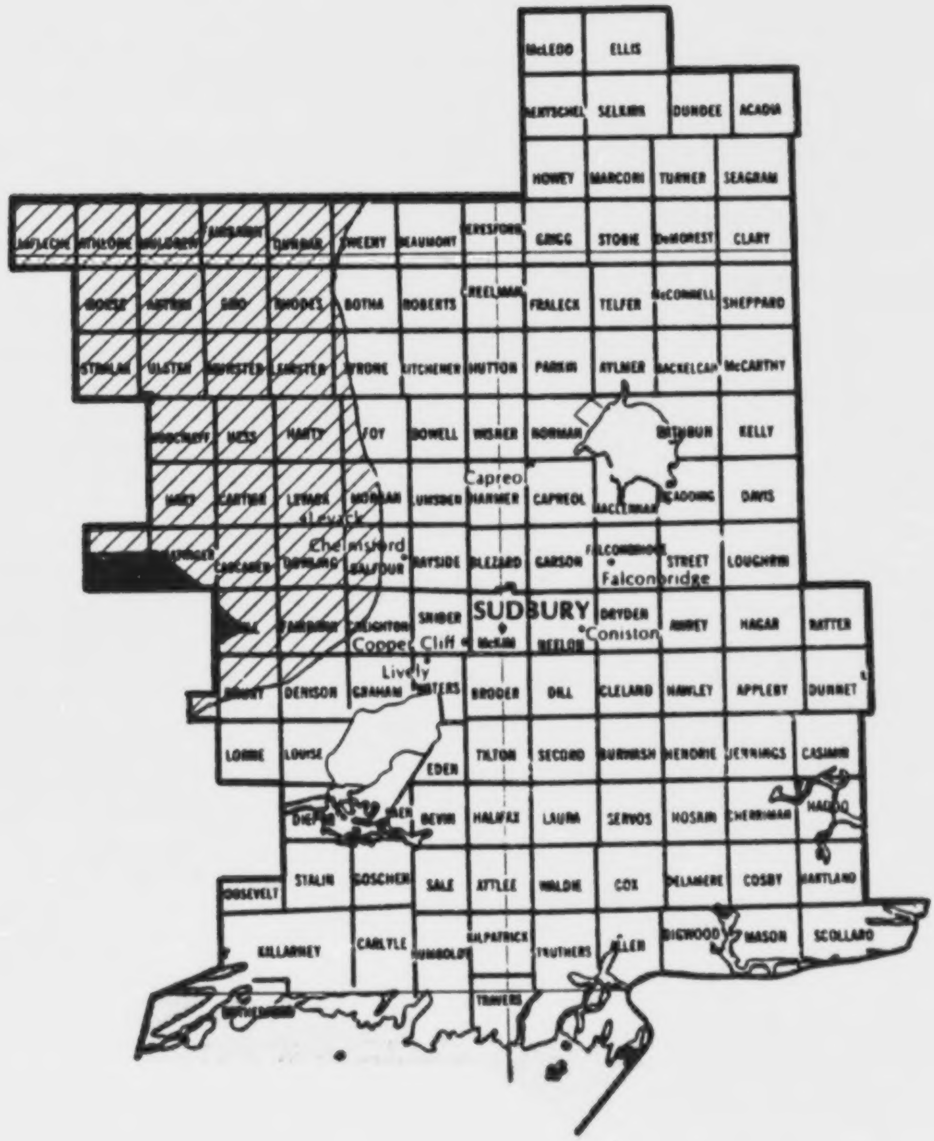
Year	Remarks
1950-1955	not reported
1956	low populations
1957	Approximately 200 km^2 were moderately-to-severely defoliated in the western part of the district (see map, page 19). A large area of light defoliation occurred, generally northward of the above-mentioned area.
1958	A general decline in the intensity of the 1957 infestation accounted for a marked reduction in the total area damaged (see map, page 20).
1959	The moderate-to-severe 1957 infestation in the western part of the Sudbury District, which declined in 1958, increased in intensity in 1959. A new infestation of moderate-to-severe intensity was recorded along the CNR on the northern border of the district (see map, page 21). An area of light defoliation occurred in this area as well.
1960	small pockets of moderate-to-severe damage reported
1961-1970	not reported
1971	Several widely scattered pockets of moderate-to-severe defoliation were reported (see map, page 22).
1972	Scattered pockets of moderate-to-severe defoliation persisted (see map, page 23).
1973	Approximately 500 km^2 of aspen stands northwest of the city of Sudbury were moderately-to-severely defoliated. Smaller pockets of moderate-to-severe defoliation were observed at widely scattered locations (see map, page 24).
1974	Populations declined. Small pockets of moderate-to-severe defoliation were observed in Antrim and Moncrieff twps (see map, page 25).

(cont'd)

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.) (concl.)

1975	Populations continued to decline. One infestation of approximately 1300 km^2 was recorded in the northwest portion of the district. North of Lake Wanapitei, small infestations occurred at two points (see map, page 26).
1976	Small pockets of moderate-to-severe defoliation occurred in Muldrew, Ulster and Morgan twps.
1977	Only occasional larvae were collected as the infestation decined to endemic levels.
1978-1980	not reported

SUDBURY DISTRICT



Large Aspen Tortrix

Areas within which defoliation occurred in 1957

Scale

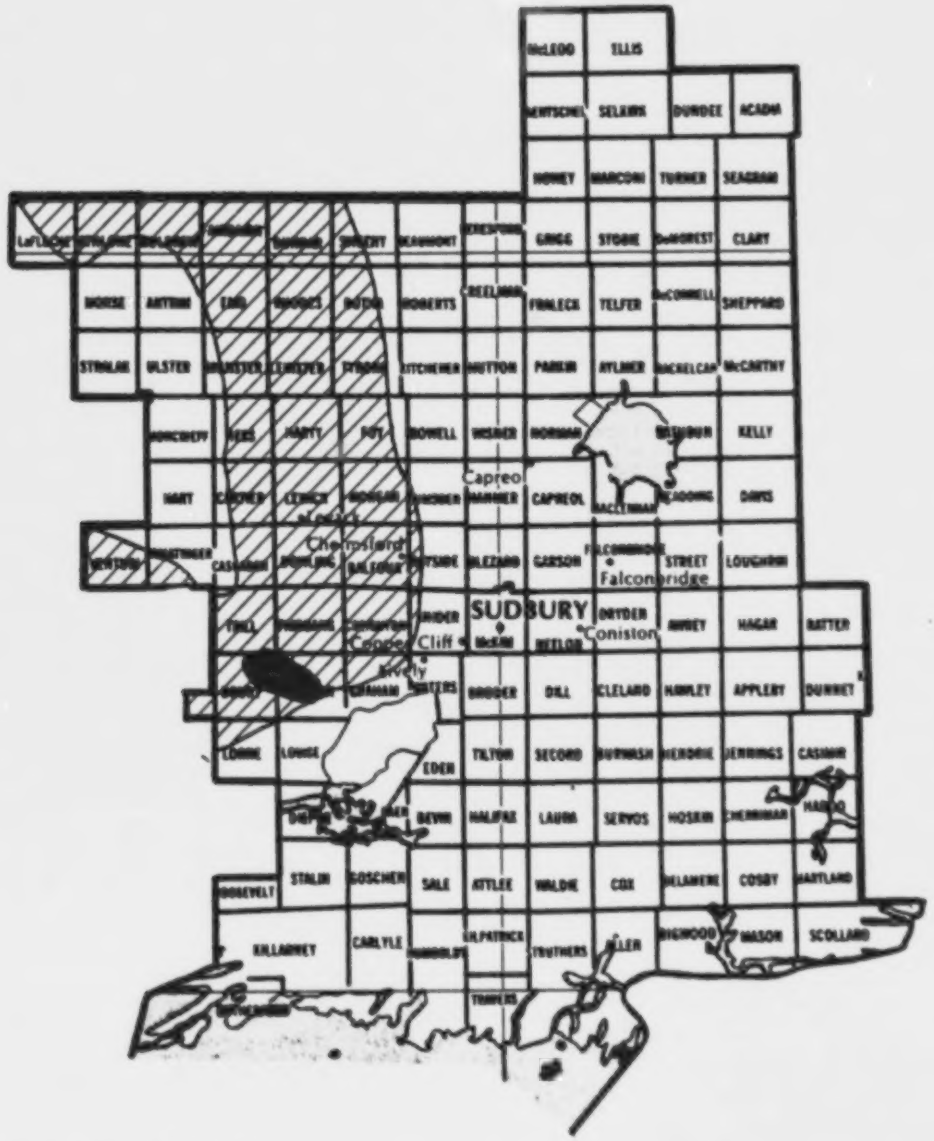
Kilometres 20 10 0 20

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ●

SUDBURY DISTRICT



Large Aspen Tortrix

Areas within which defoliation occurred in 1958

LEGEND

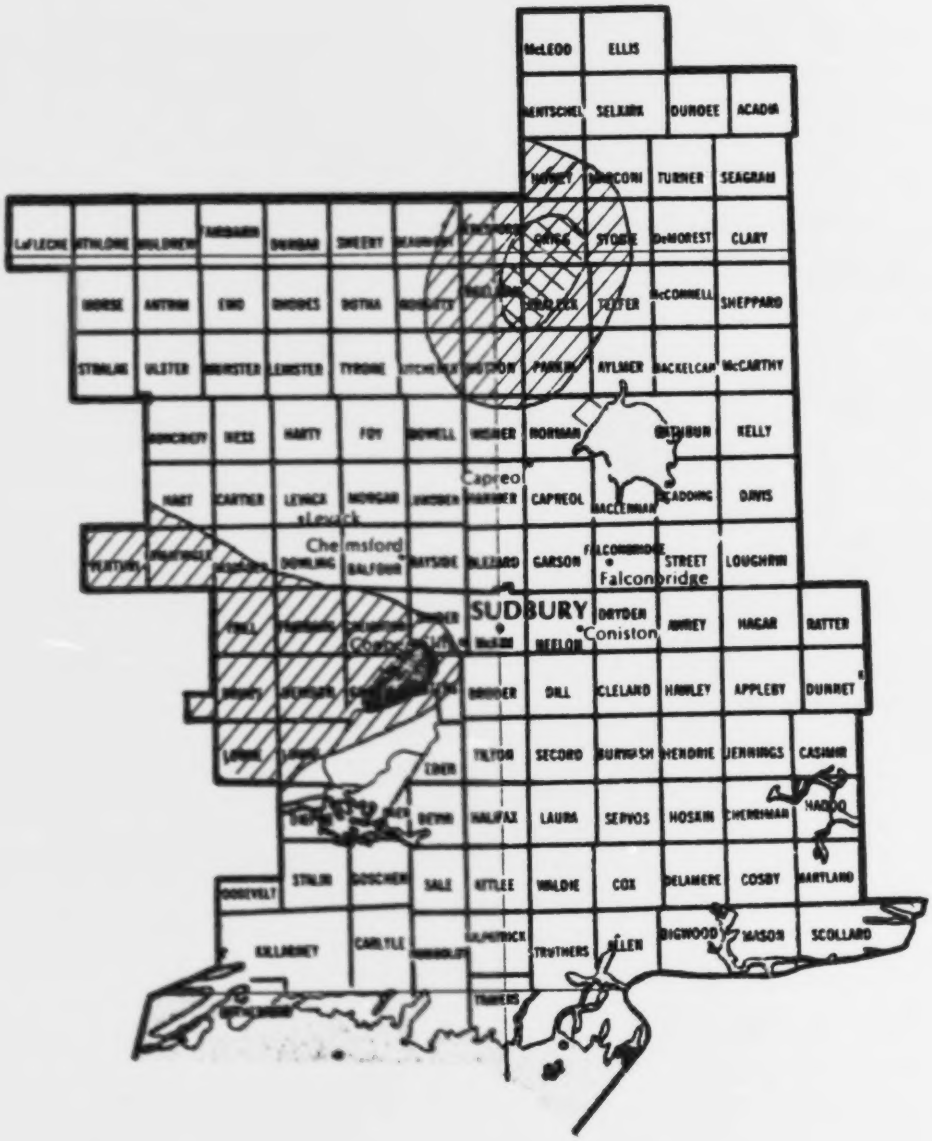
Light defoliation ▨

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Large Aspen Tortrix

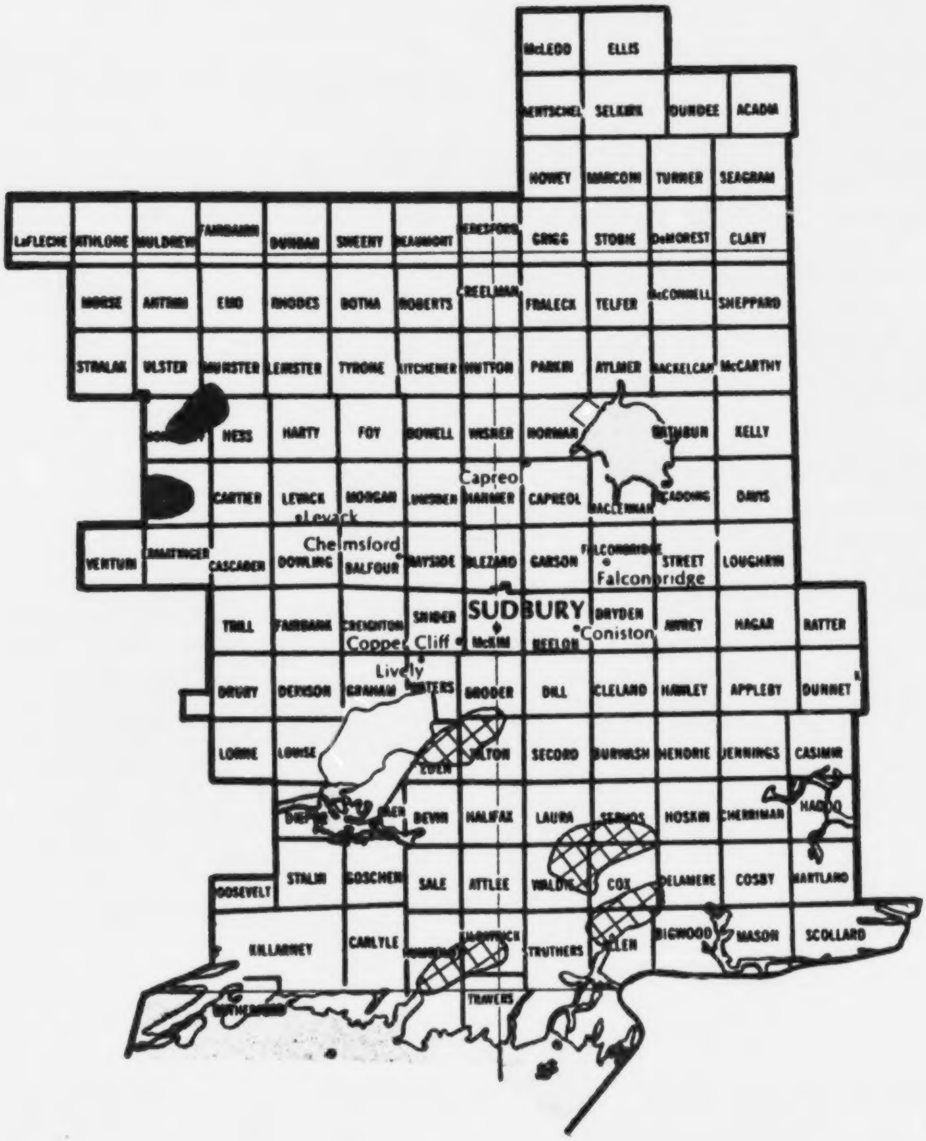
Areas within which defoliation occurred in 1959

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ☒

SUDBURY DISTRICT



Large Aspen Tortrix

Areas within which defoliation occurred in 1971

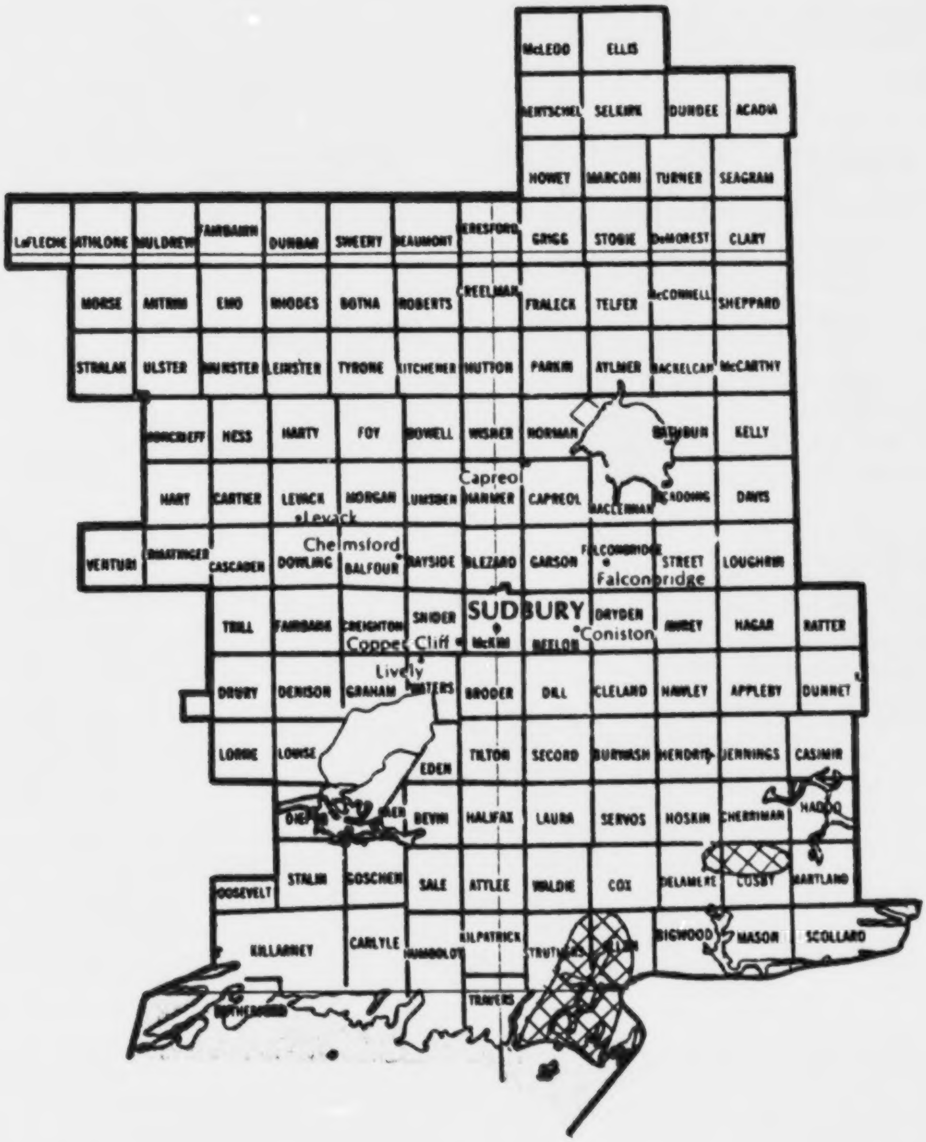
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Large Aspen Tortrix

Areas within which defoliation occurred in 1972

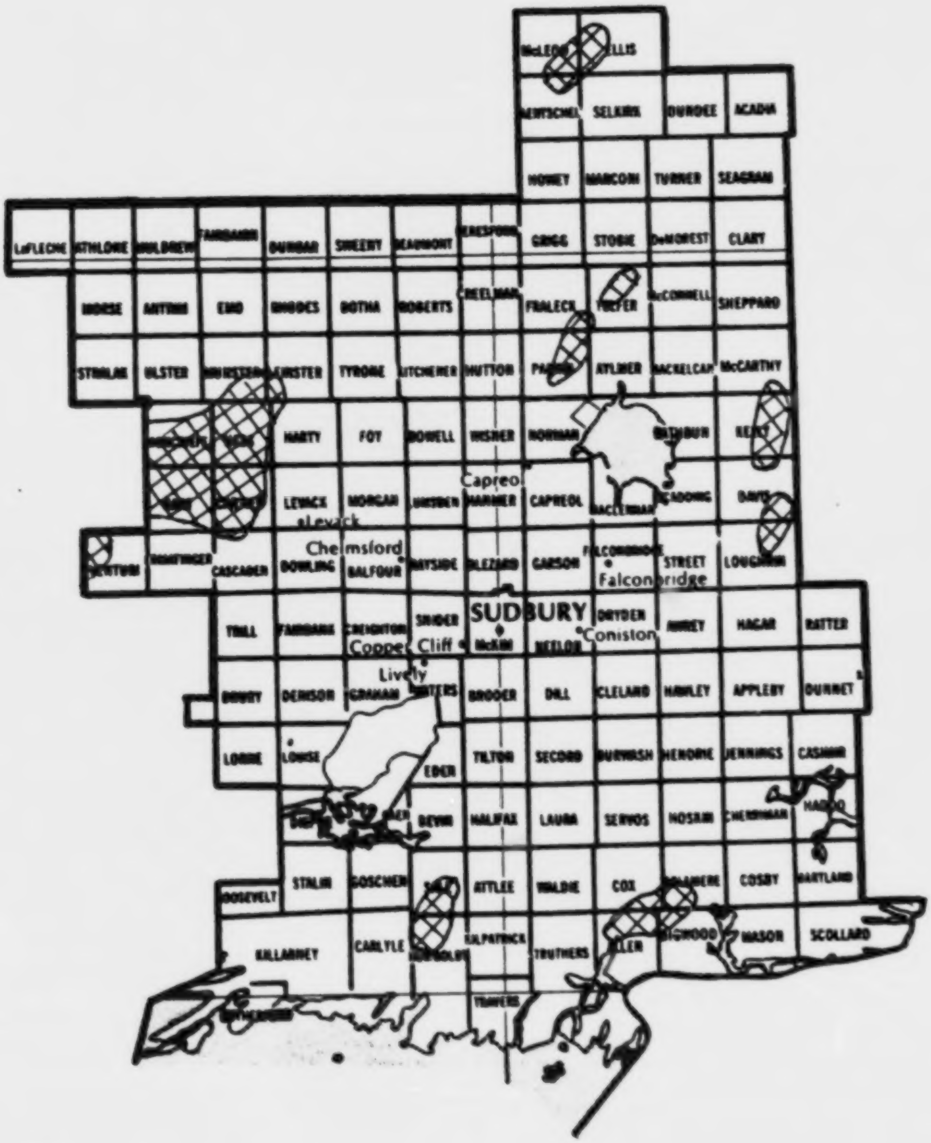
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Large Aspen Tortrix

Areas within which defoliation occurred in 1973

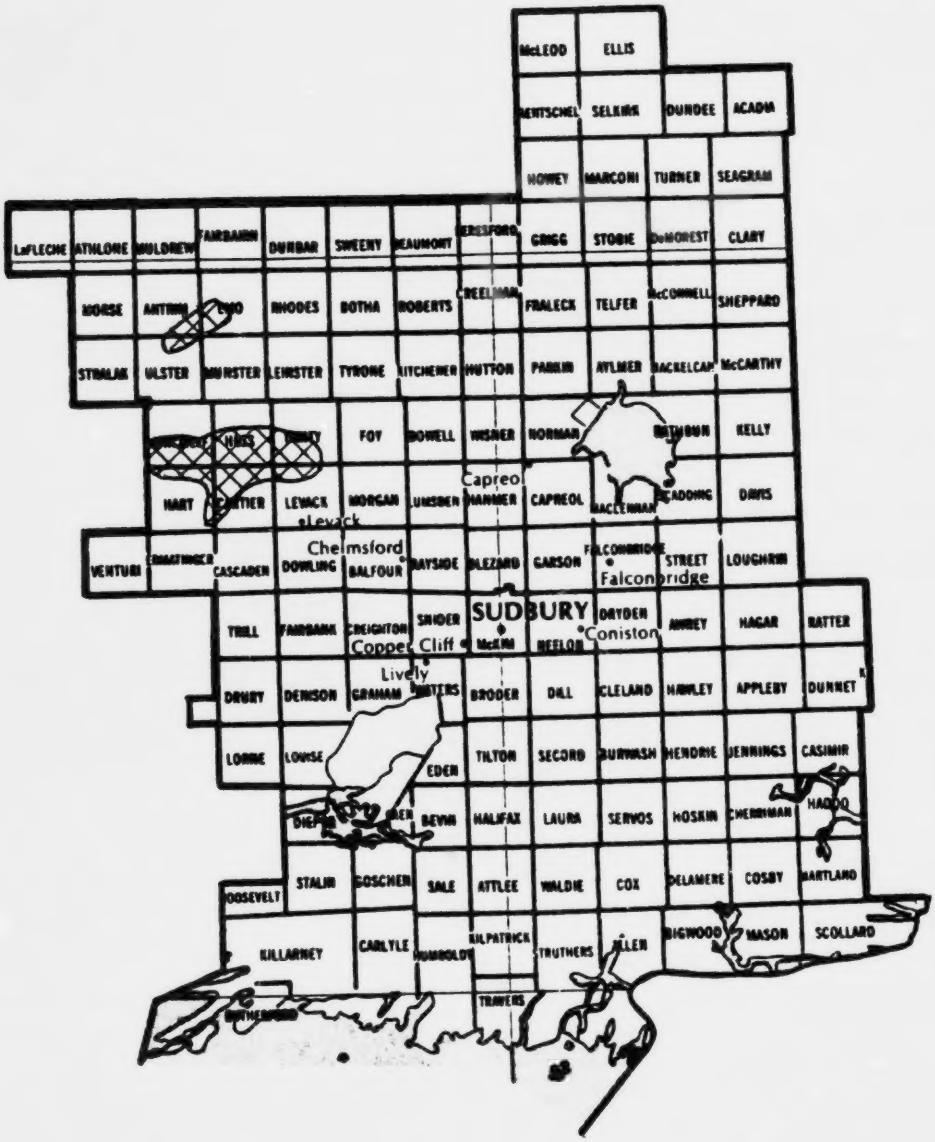
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Large Aspen Tortrix

Areas within which defoliation occurred in 1974

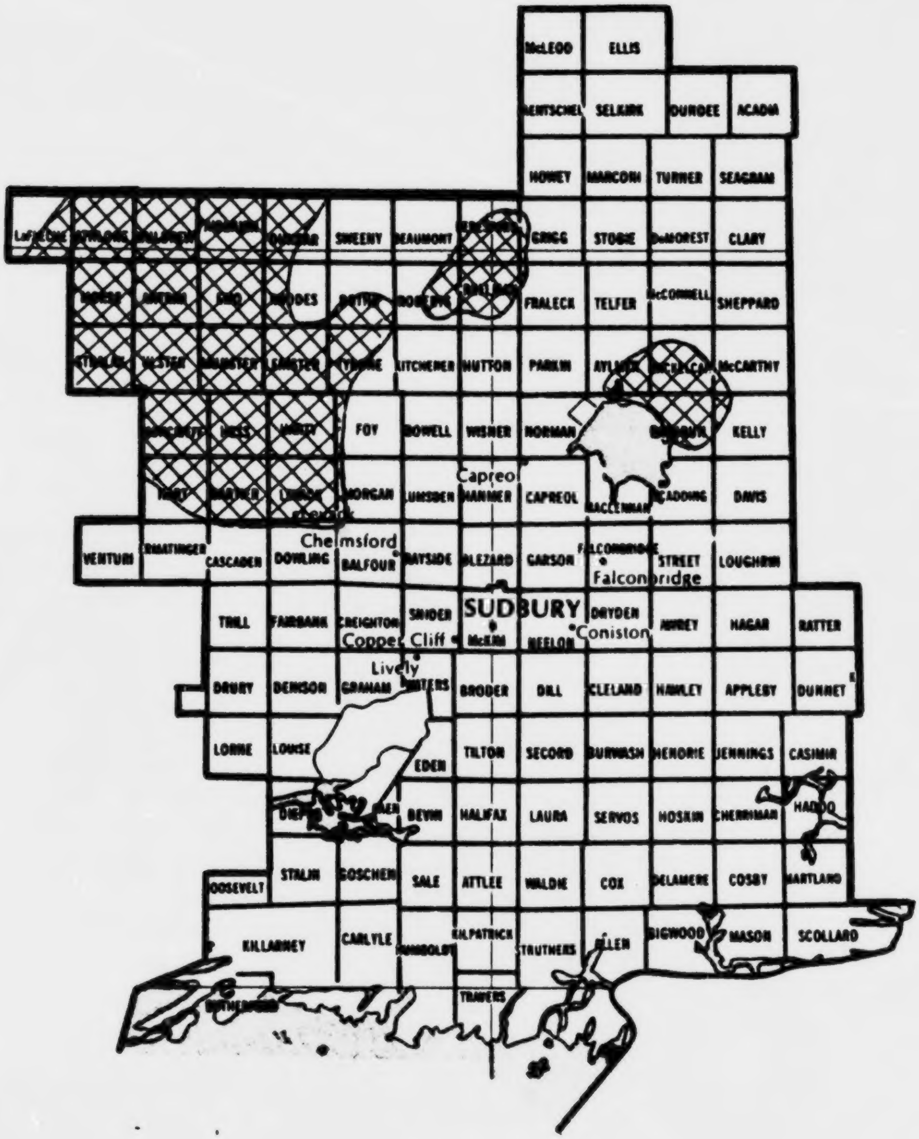
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Large Aspen Tortrix

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Host(s): bF, spruce [Major]

Year	Remarks
1950	endemic levels
1951-1954	not reported
1955	light infestation in Moncrieff Twp
1956	not reported
1957-1960	trace populations at widely scattered points
1961-1965	low populations
1966	A heavy infestation occurred in the upper crowns of mature balsam fir in Cosby Twp and a light infestation was observed in a mixed stand of balsam fir and white spruce in Balfour Twp.
1967	a marked decrease in populations
1968	Populations increased sharply. Moderate-to-severe defoliation was observed at two locations in Fairbank and Creighton twps and covered an area of 7070 ha (see map, page 30).
1969	A new medium-to-heavy infestation comprising approximately 1032 km^2 occurred in the area between Onaping Lake and the CNR and extended north into the Gogama District. The infestation in Fairbank Twp increased. Three smaller and widely separated infestations ranging in size from 2.58 to 90.30 km^2 were also observed (see map, page 31).
1970	Populations continued to spread in the district (see map, page 32).
1971	Major increases occurred in the large infestation centred on Onaping Lake and in an infestation lying to the east of the Onaping infestation and to the north of Lake Wanapitei. Several new pockets of medium-to-heavy infestation were detected at widely scattered locations in the district (see map, page 33).

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (cont'd)

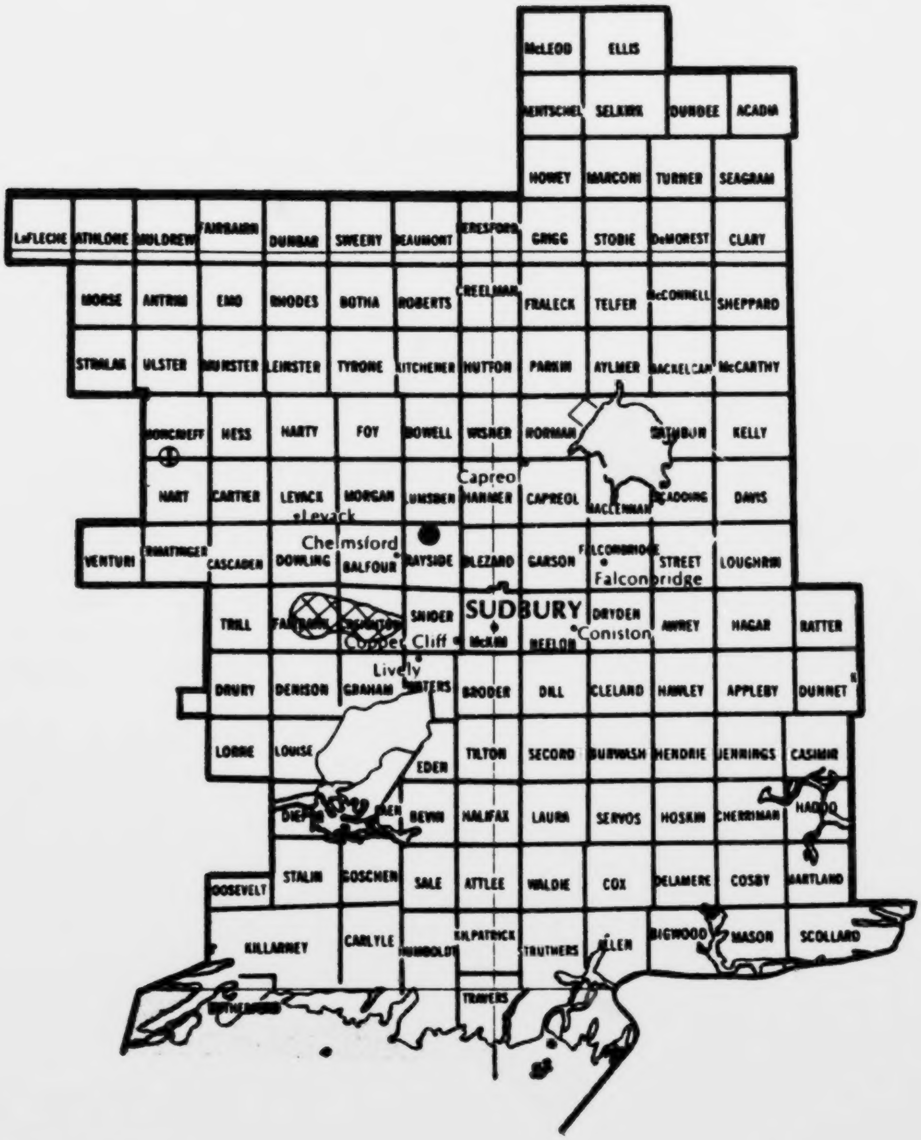
Year	Remarks
1972	Population levels continued to spread in the district (see map, page 34). Balsam fir mortality was noted in the Rome Lake area in Sweeny, Dunbar, Rhodes and Botha twps.
1973	Budworm was widespread in the district. New infestations were located west of Capreol in Foy, Morgan, Bowell and Lumsden twps and covered approximately 12,120 ha (see map, page 35). Mortality was observed in the northern part of the district (see map, page 36).
1974	Populations continue to spread in the district (see map, page 37). Balsam fir mortality extended from the northern boundary of the district south into Munster, Leinster, Tyrone and Kitchener twps (see map, page 38).
1975	There was modest expansion of the infestation, generally to the south in the Sudbury District. Increases in infested areas occurred in the area between the west arm of Lake Nipissing west across the southern part of the Sudbury District to Killarney Provincial Park and Lake Panache (see map, page 39). Mortality increased (see map, page 40).
1976	There was a slight reduction in infestation boundaries. The main reduction occurred north of Capreol and Lake Wanapitei north and west of Levack. Other infestations south of Sudbury were reduced in size (see map, page 41). Balsam fir tree mortality counts increased by 20% (see map, page 42).
1977	There were further reductions in infestation in the district. A noticeable reduction was observed in the southern part of the district and small numbers occurred throughout most of the central part of the district (see map, page 43). Mortality of balsam fir averaged 69% and white spruce 8% (see map, page 44).
1978	Populations increased, especially in the southern part of the district (see map, page 45). Balsam fir mortality continued, especially in the northeastern and northwestern parts of the district, and exceeded 76% (see map, page 46).

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (concl.)

Year	Remarks
1979	An eastward and westward spread of the infestation was noted in the district (see map, page 47). Mortality of balsam fir was comparable to that of 1978, with no new areas being affected (see map, page 48).
1980	The area of budworm infestation changed only slightly in the district (see map, page 49). Tree mortality continued in the district. The highest mortality level for white spruce in northeastern Ontario was 33% in Stobie Twp, Sudbury District (see map, page 50).

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1968

LEGEND

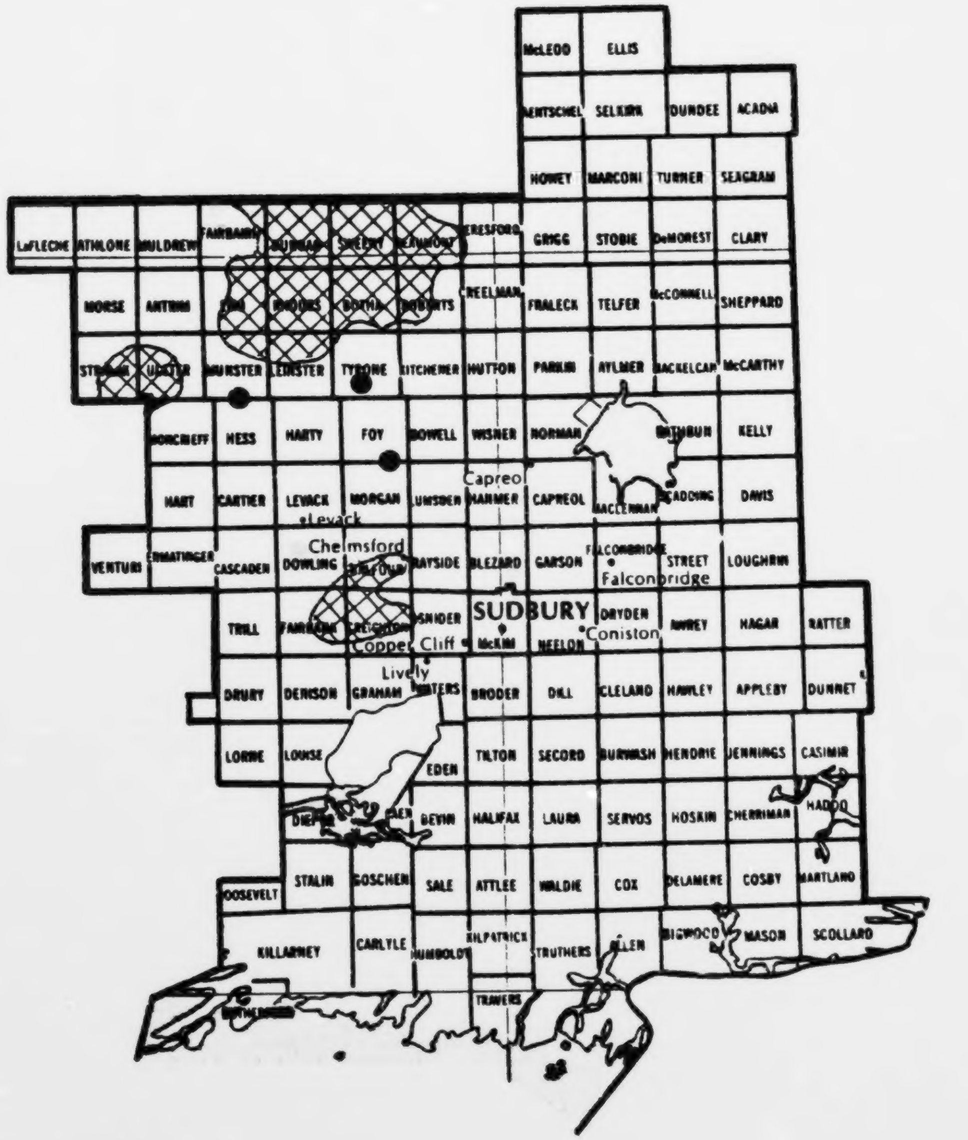
Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1969

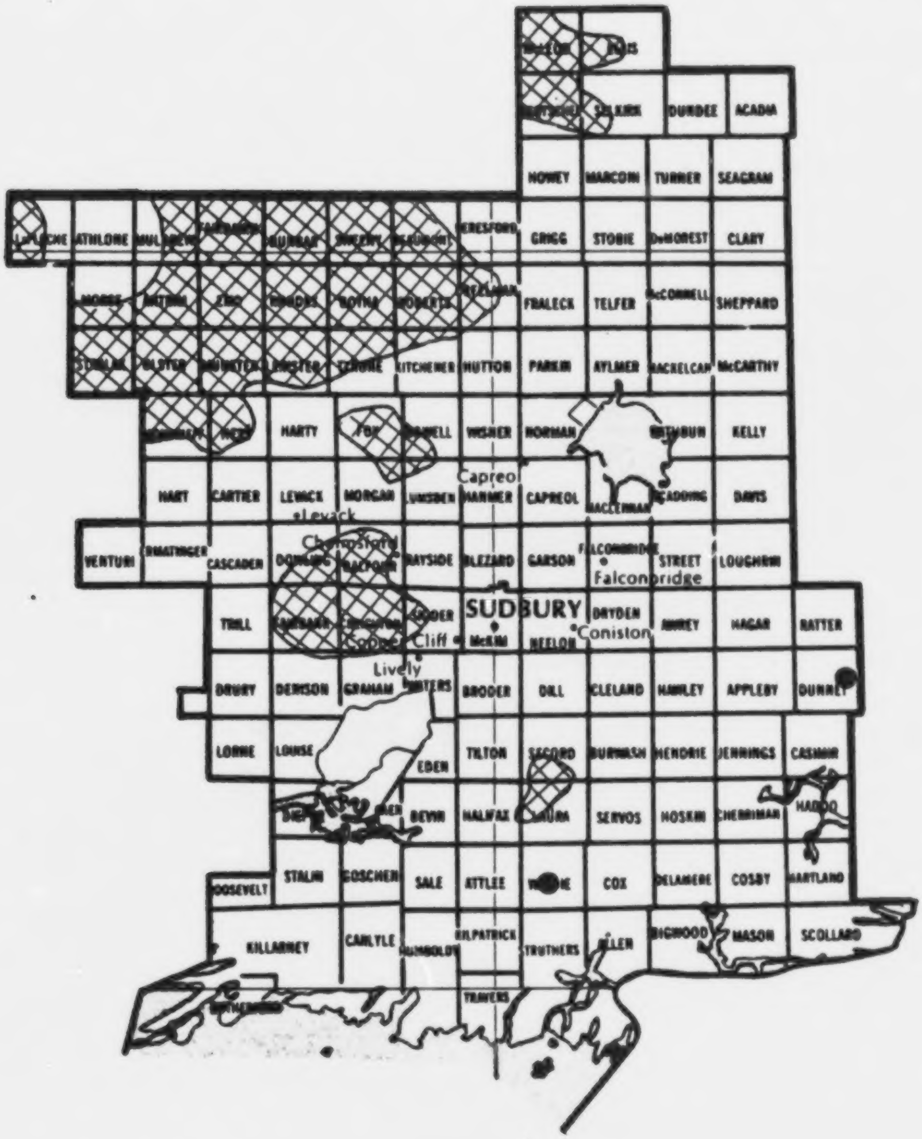
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1970

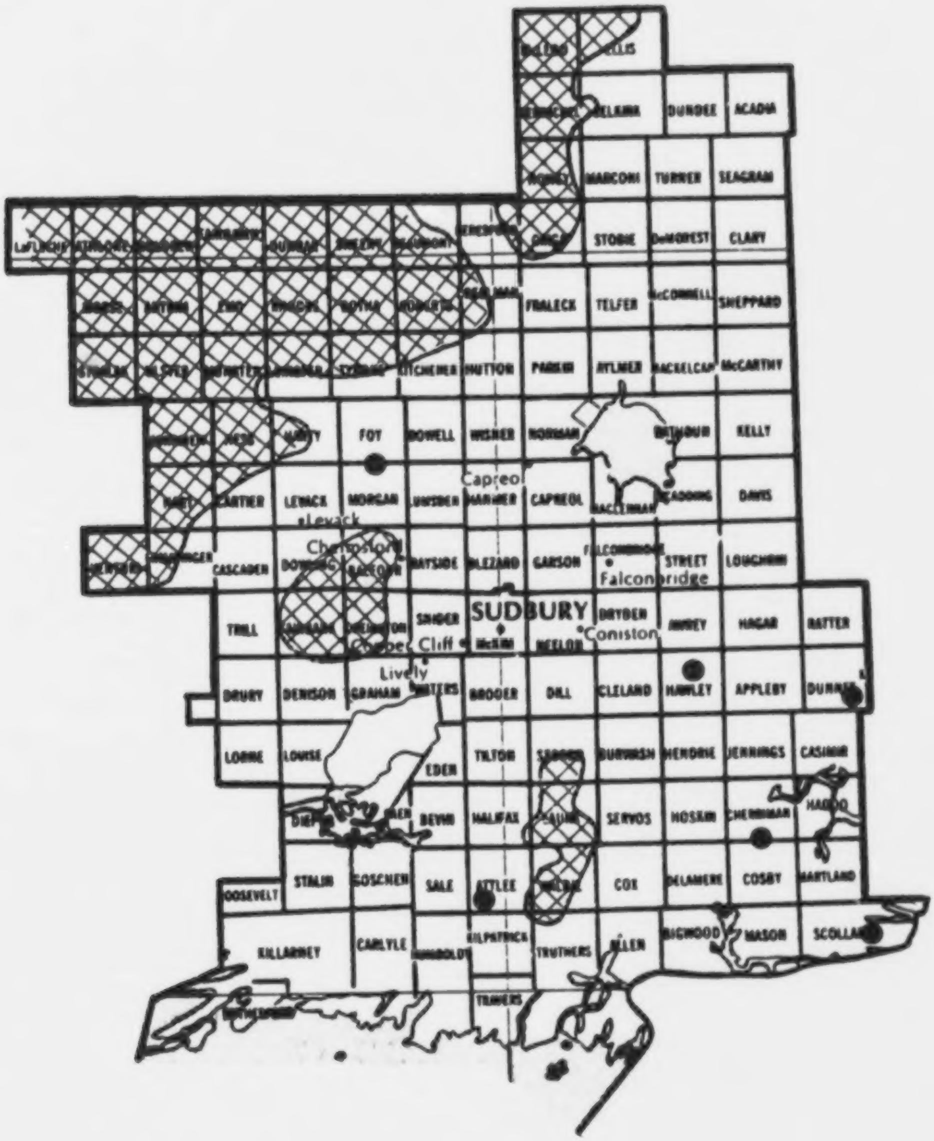
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1971

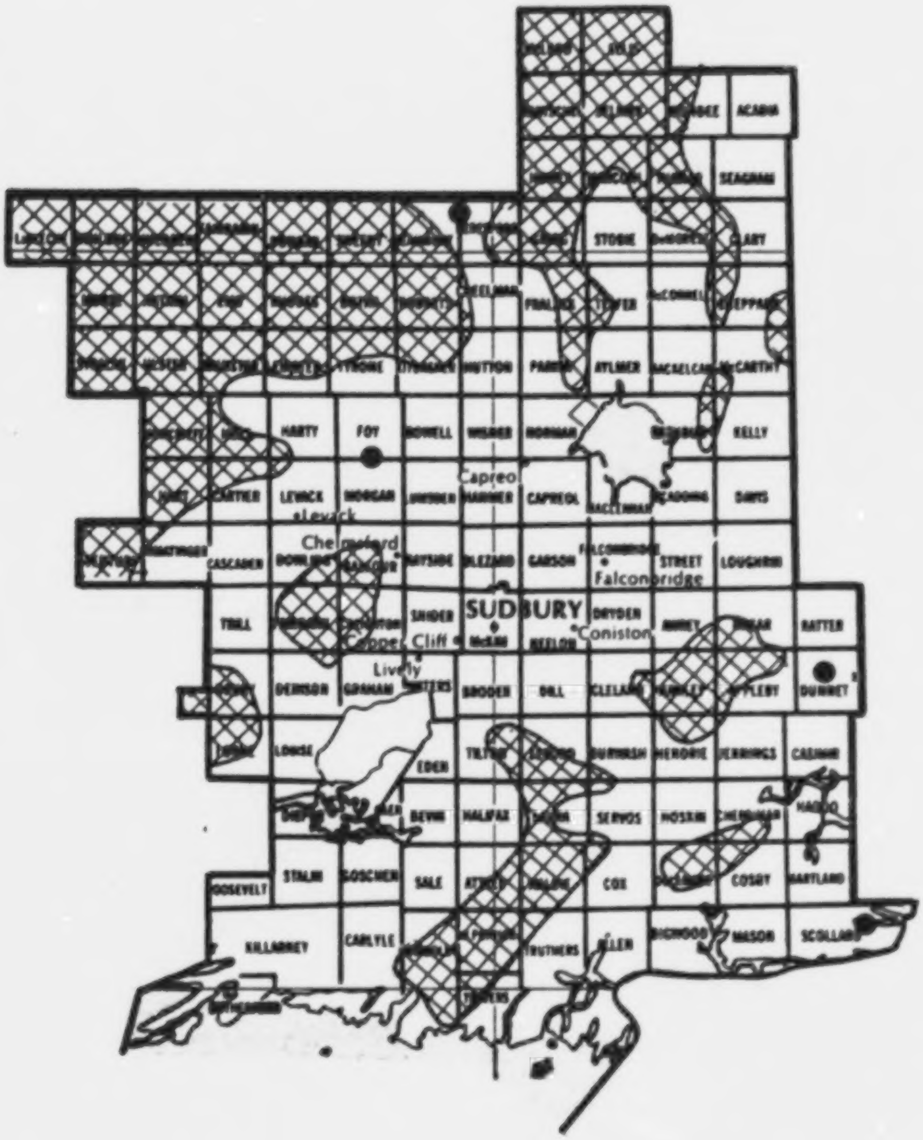
Scale

metres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1972

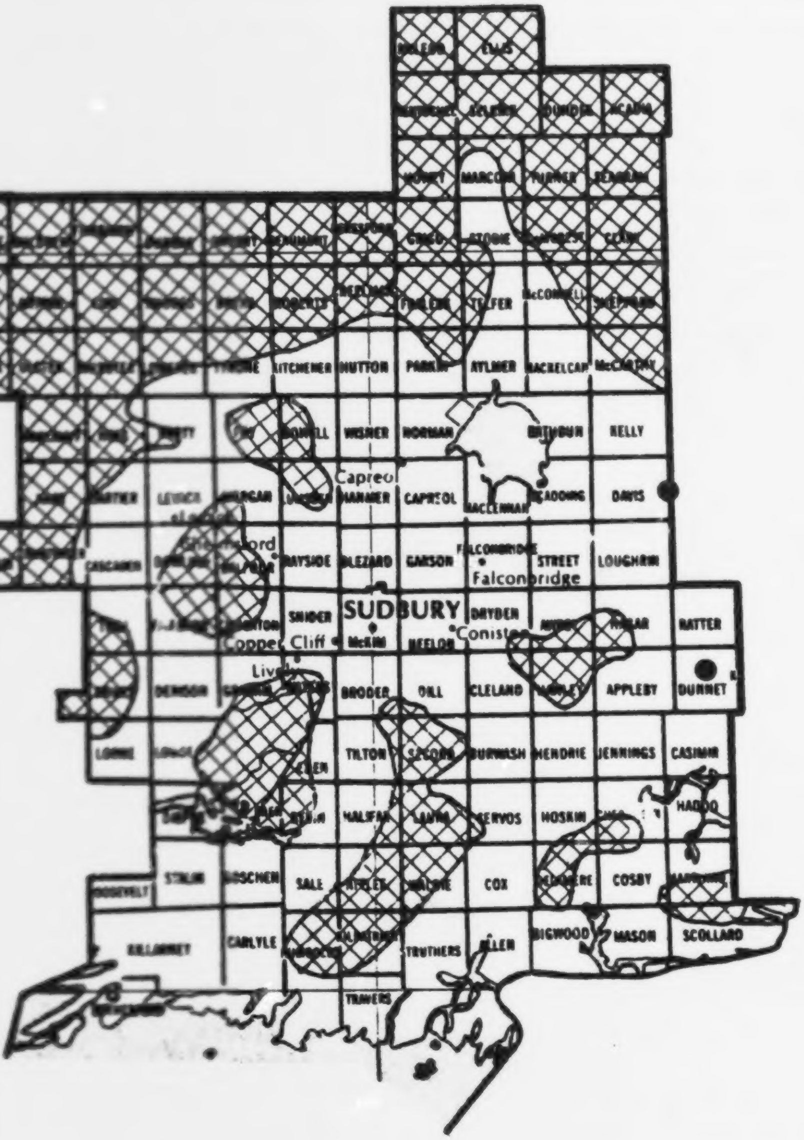
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation
occurred in 1973

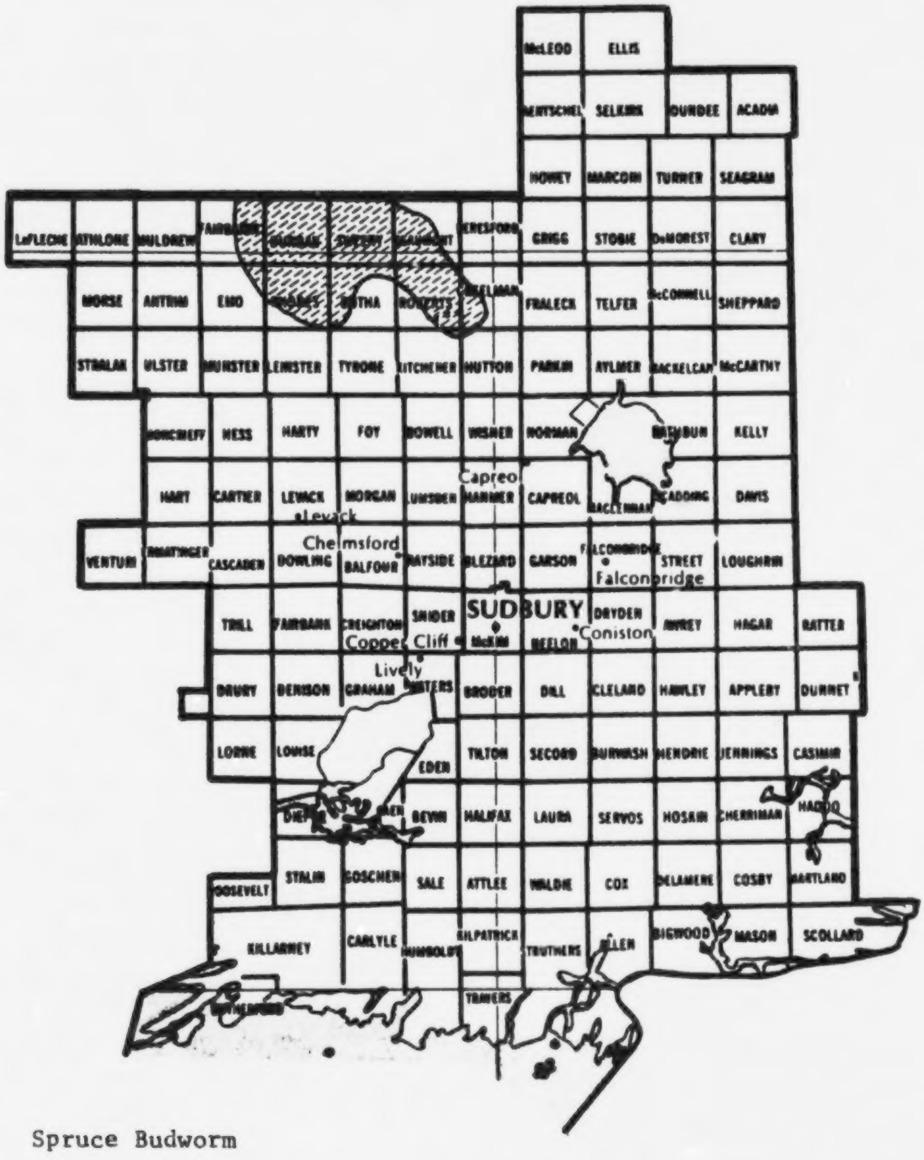
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which whole tree and top mortality occurred in 1973

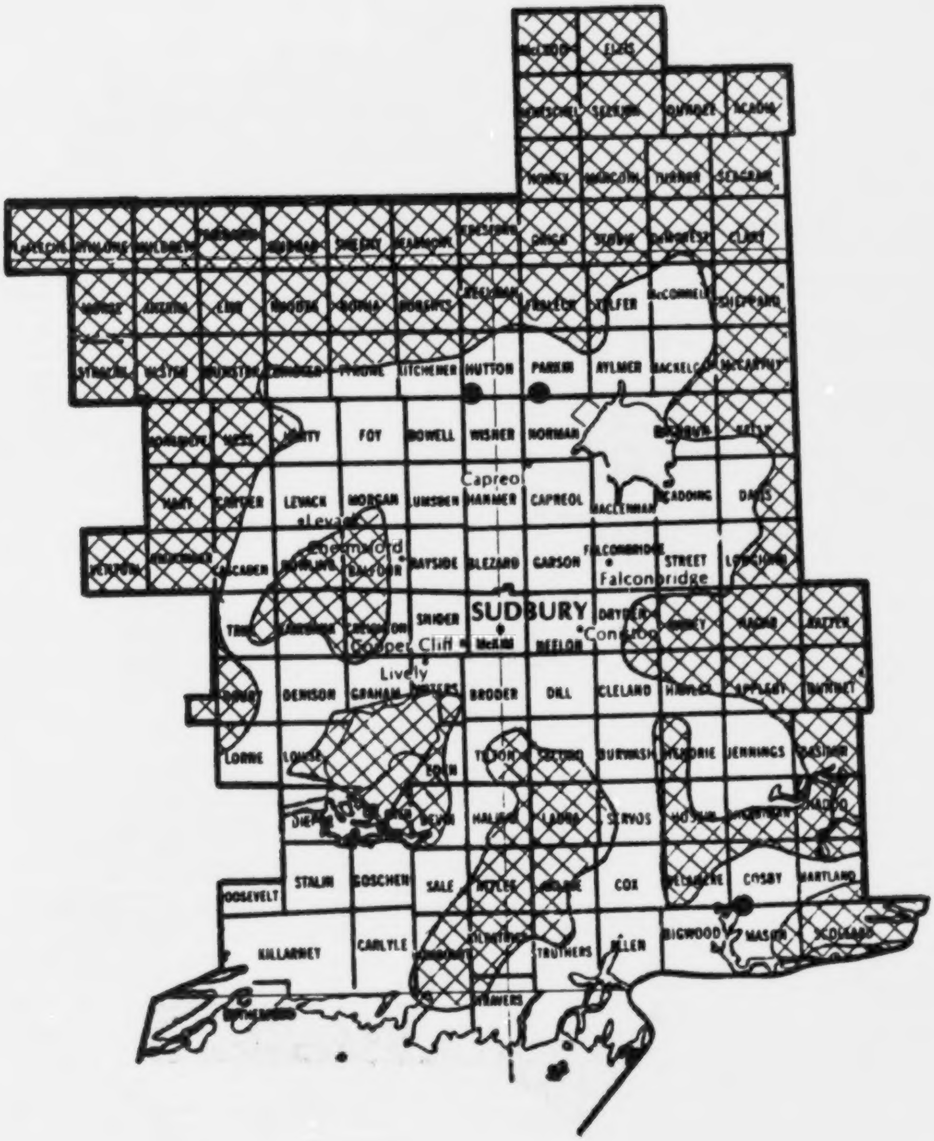
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1974

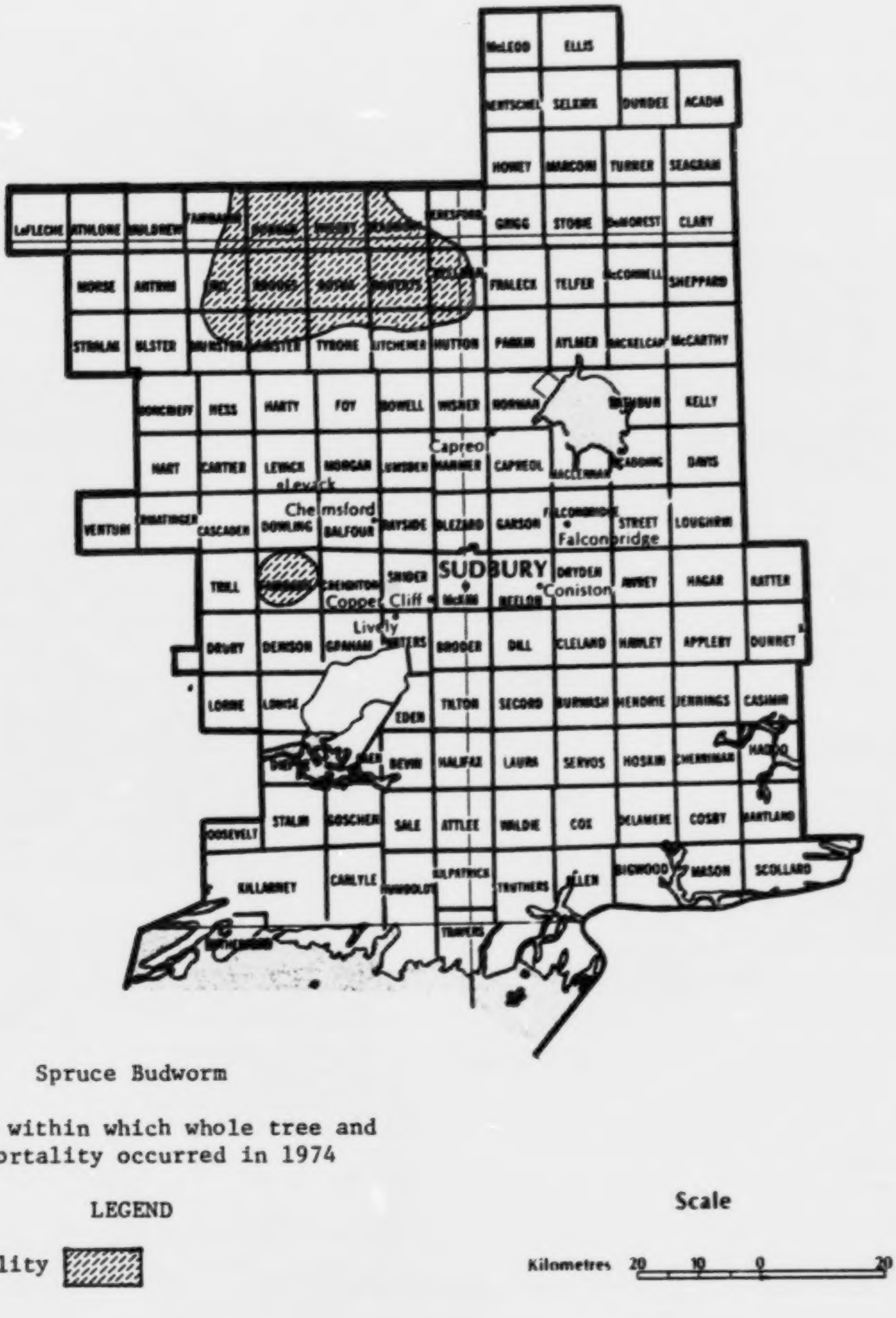
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which whole tree and
top mortality occurred in 1974

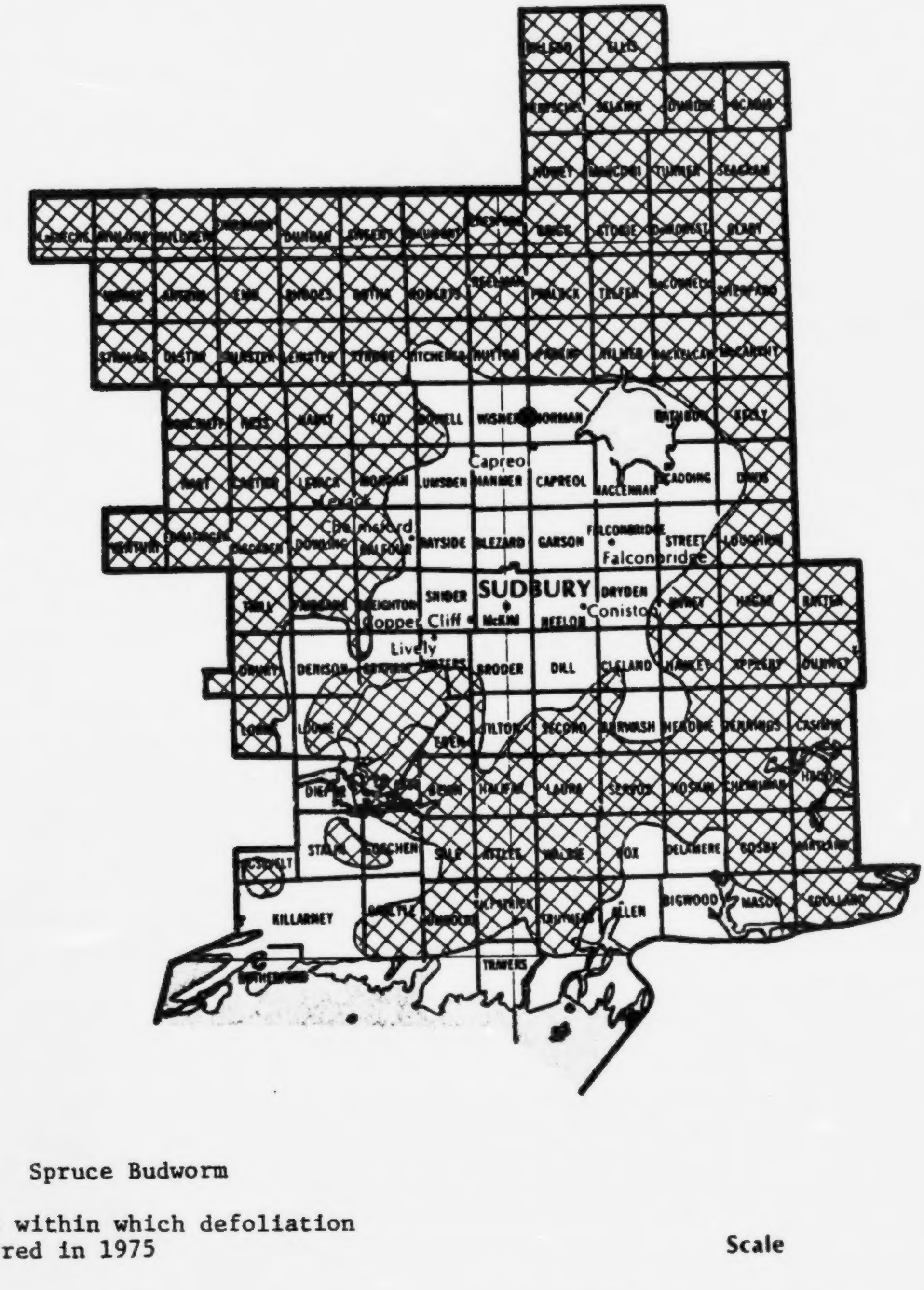
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation
occurred in 1975

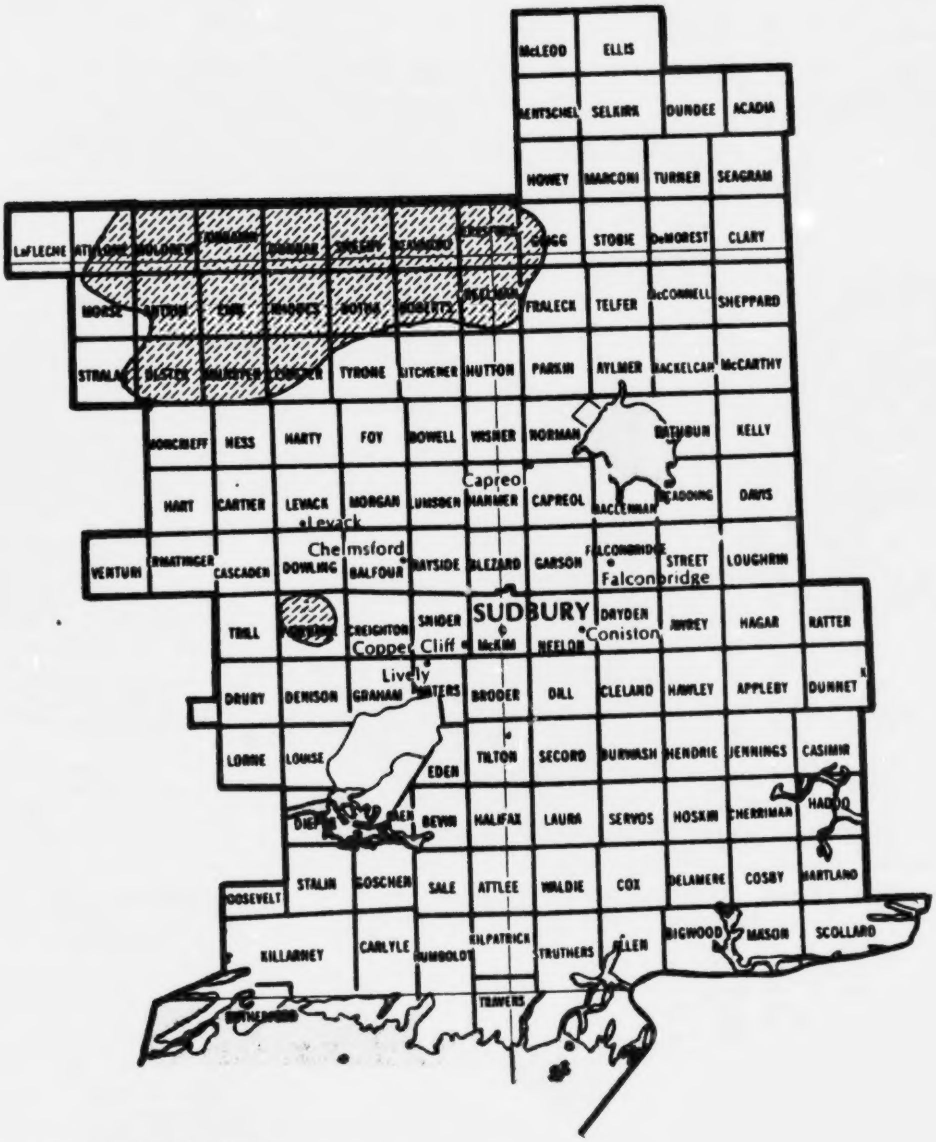
Scale

LEGEND

Kilometres 20 10 0 20

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1975

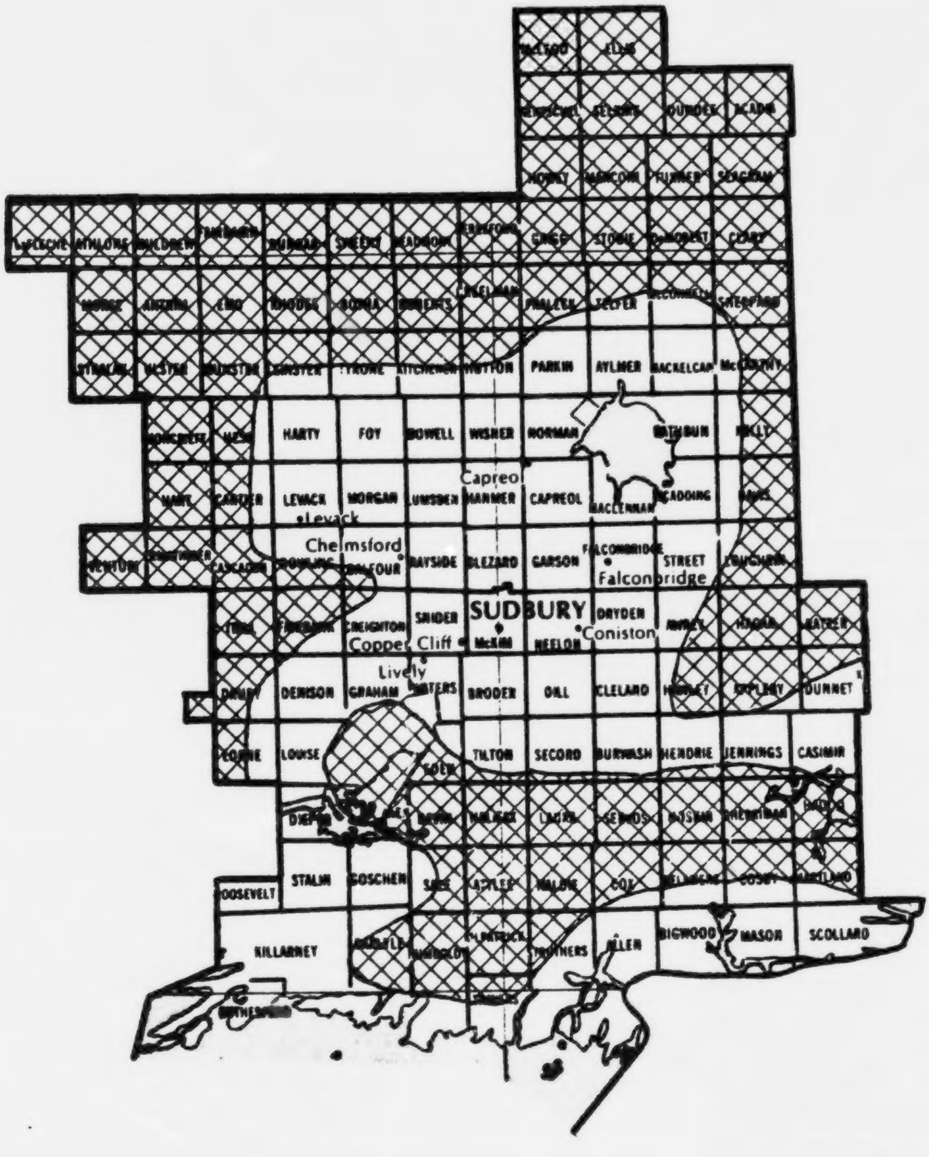
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation
occurred in 1976

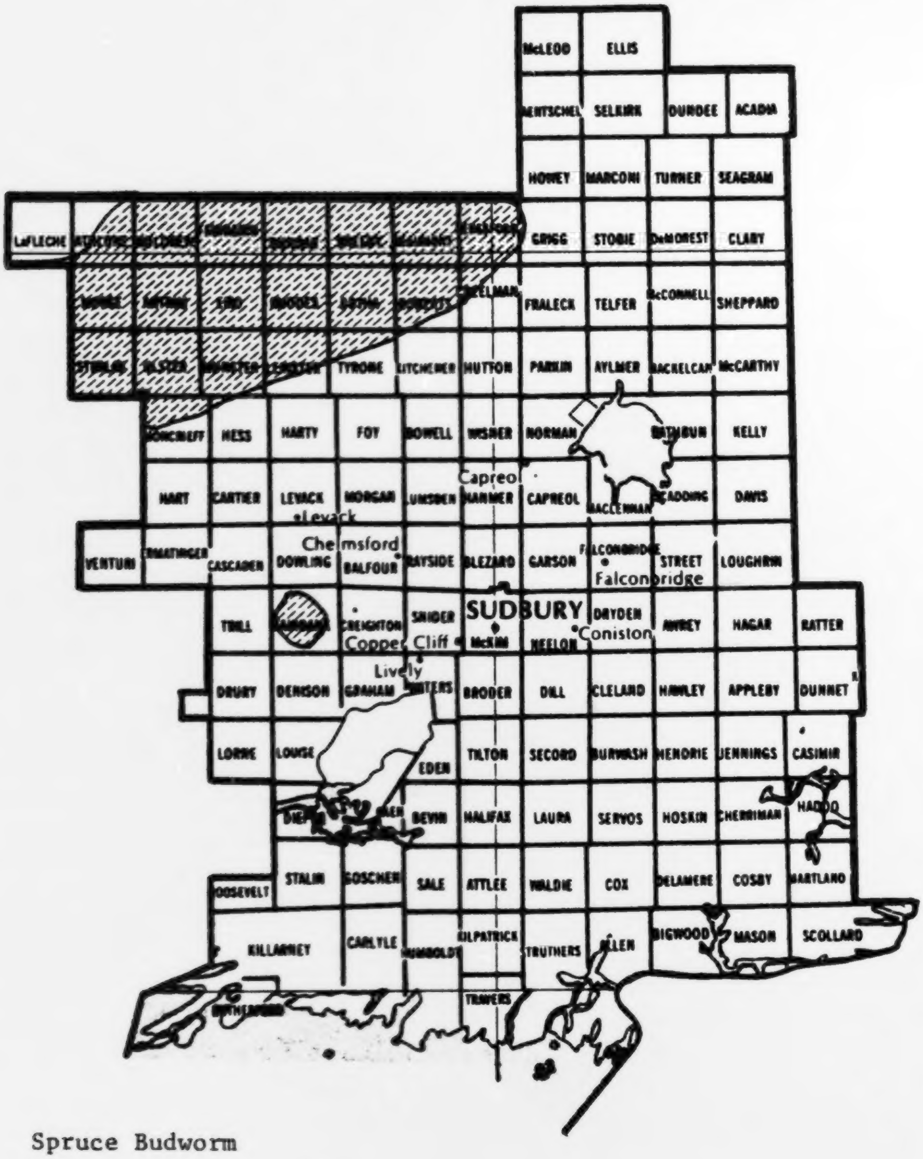
Scale

LEGEND

Kilometres 20 10 0 20

Moderate-to-severe defoliation ▨

SUDBURY DISTRICT



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1976

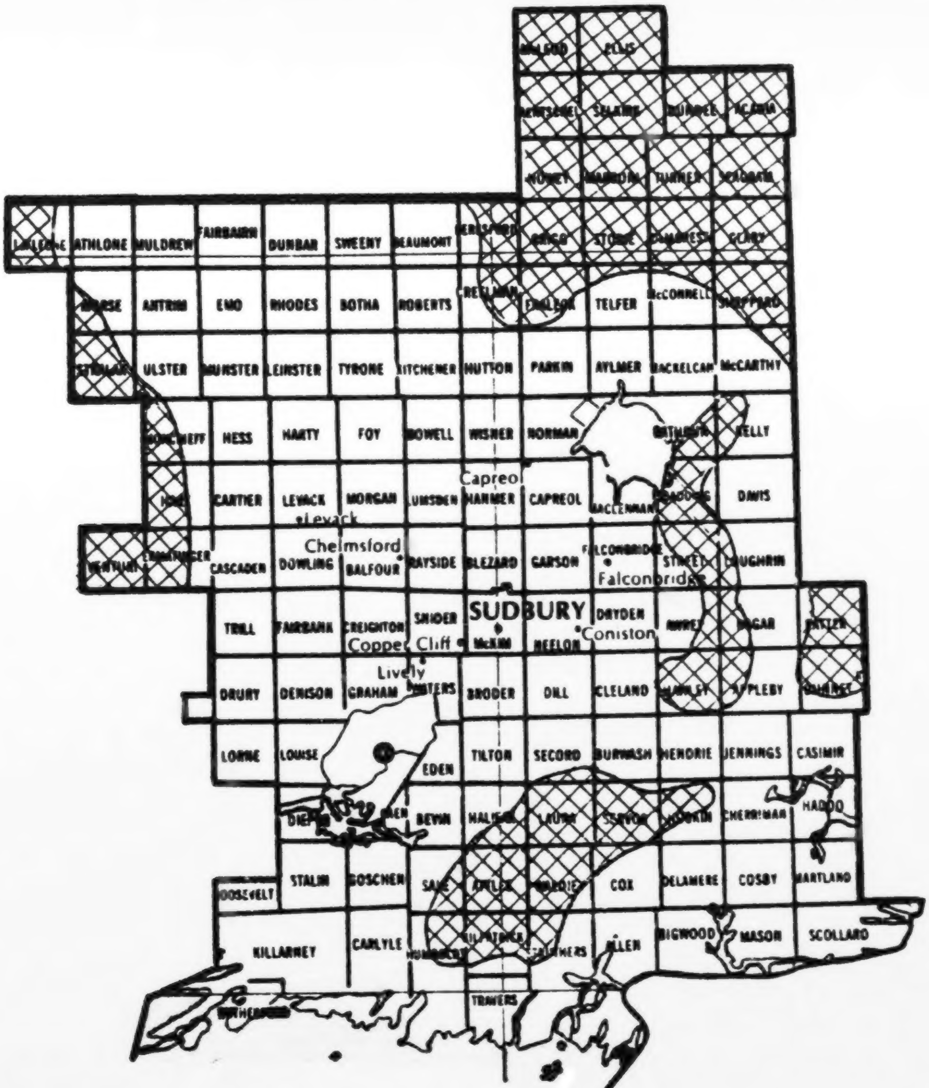
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation
occurred in 1977

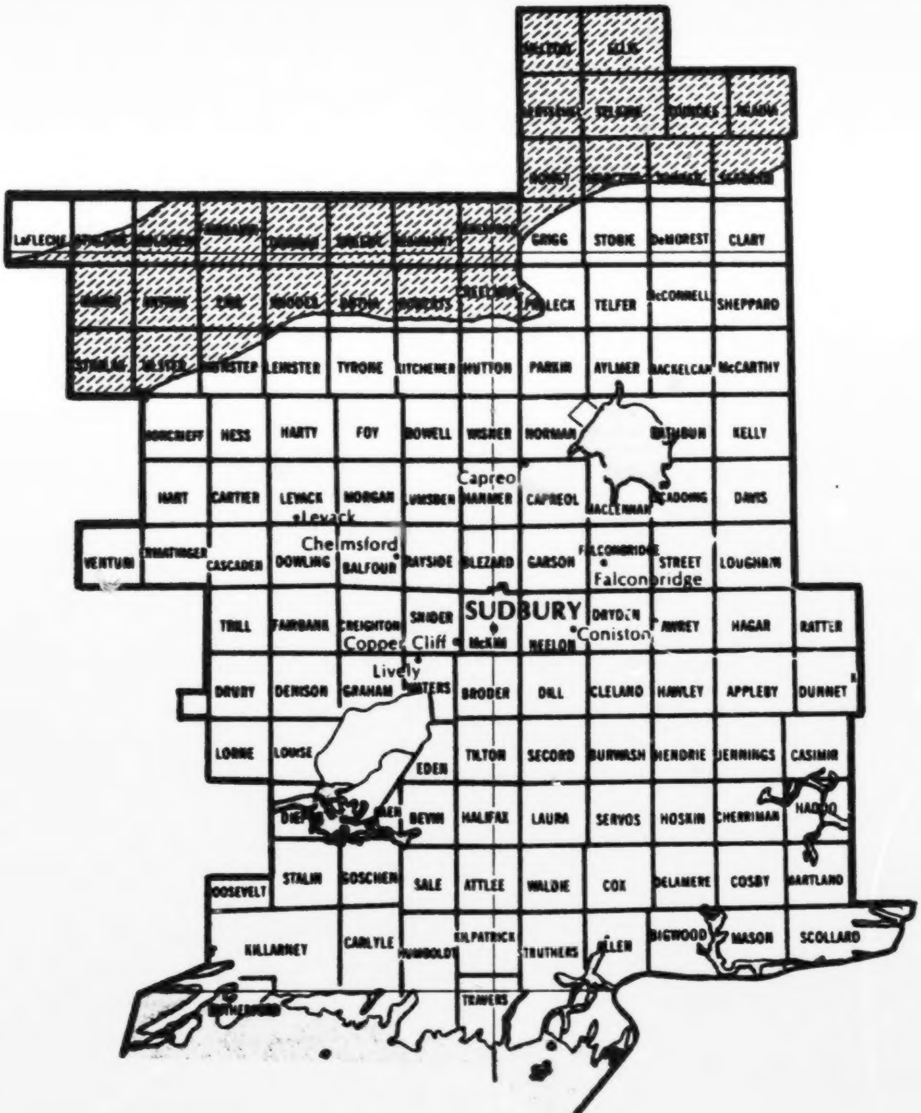
Scale

LEGEND

Kilometres 20 10 0 20

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1977

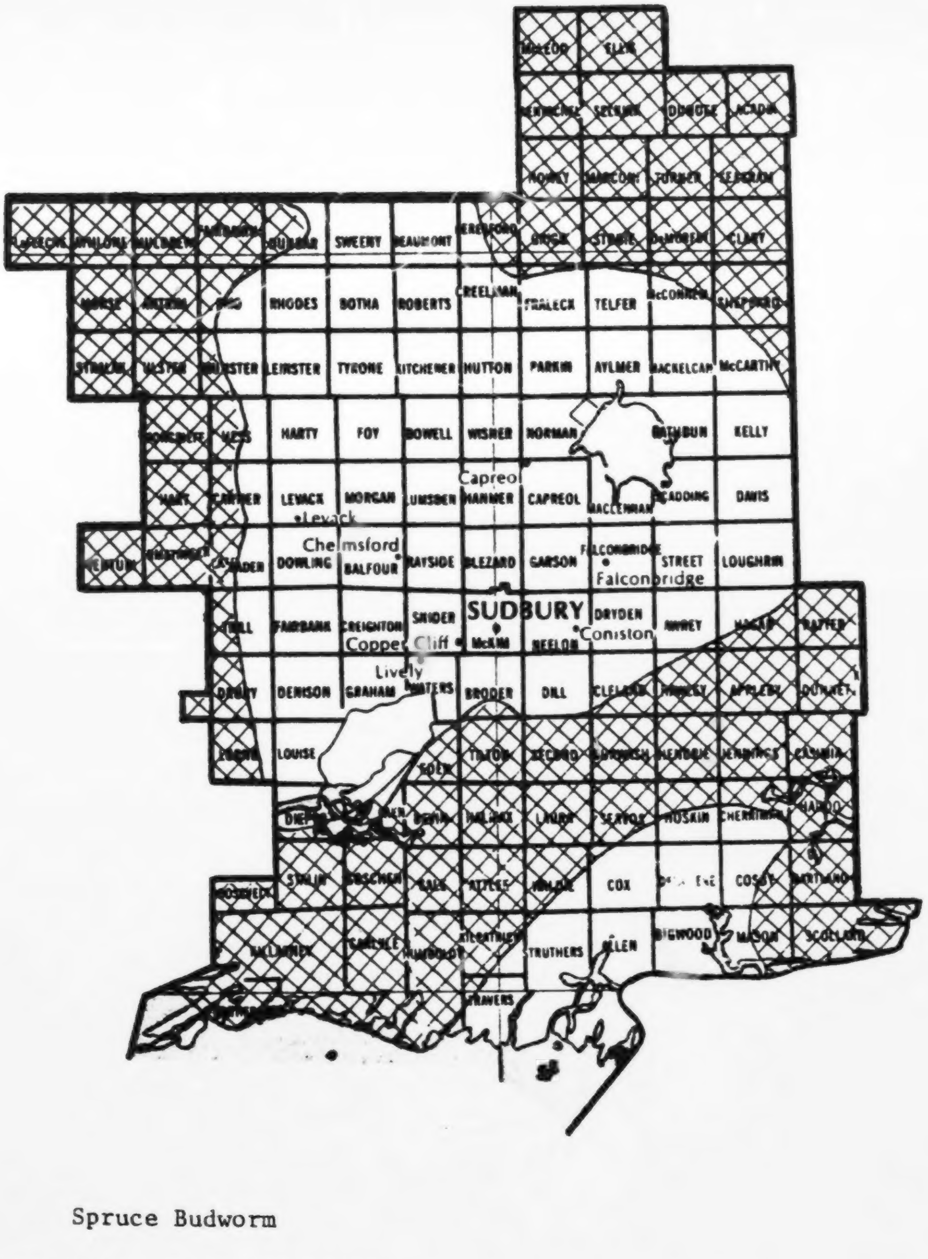
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation
occurred in 1978

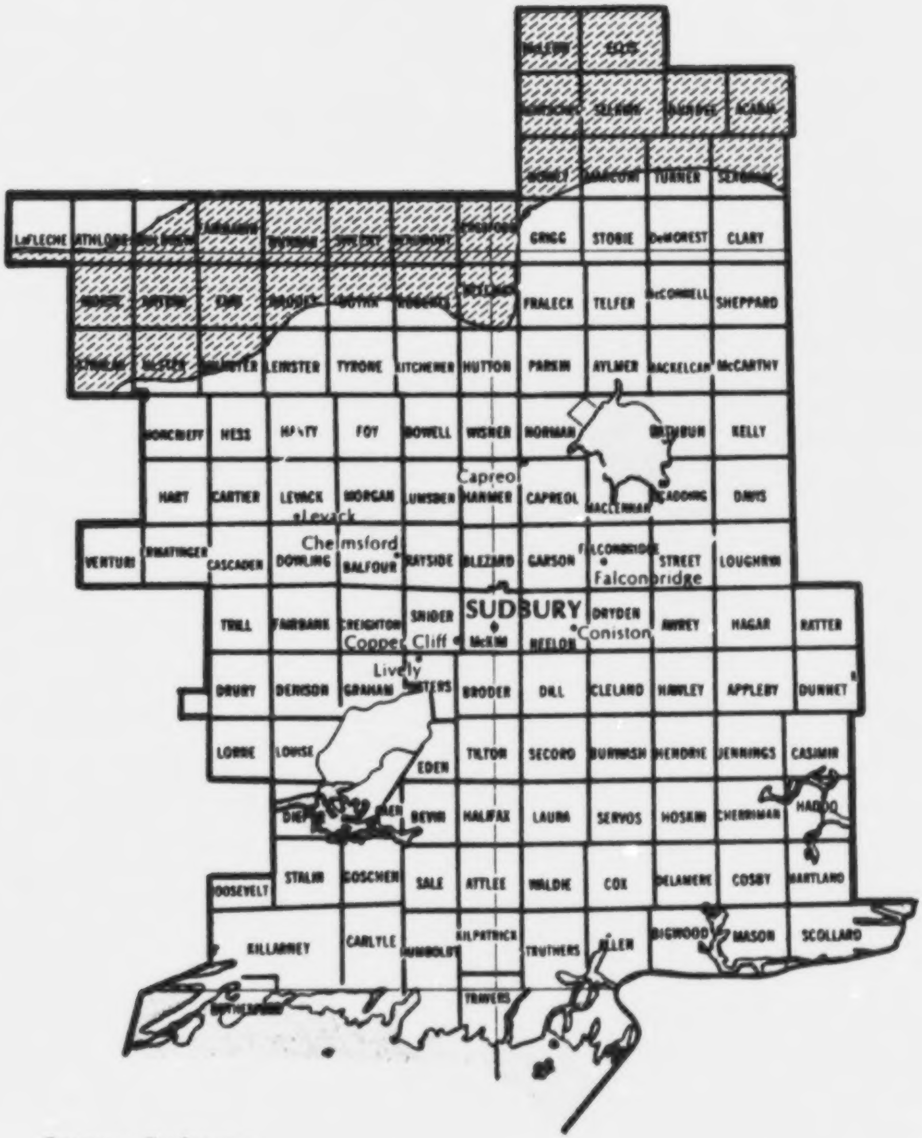
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1978

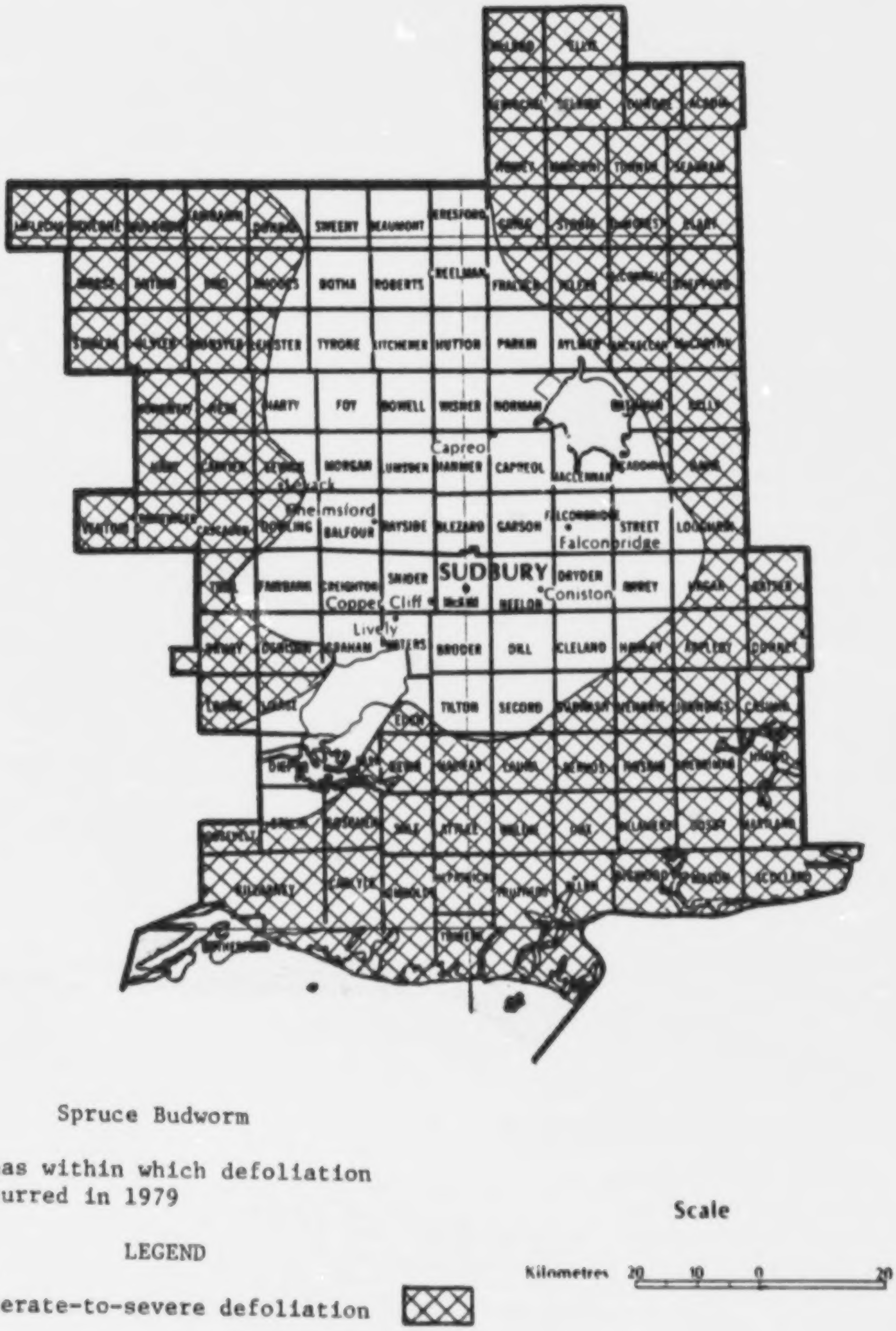
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1979

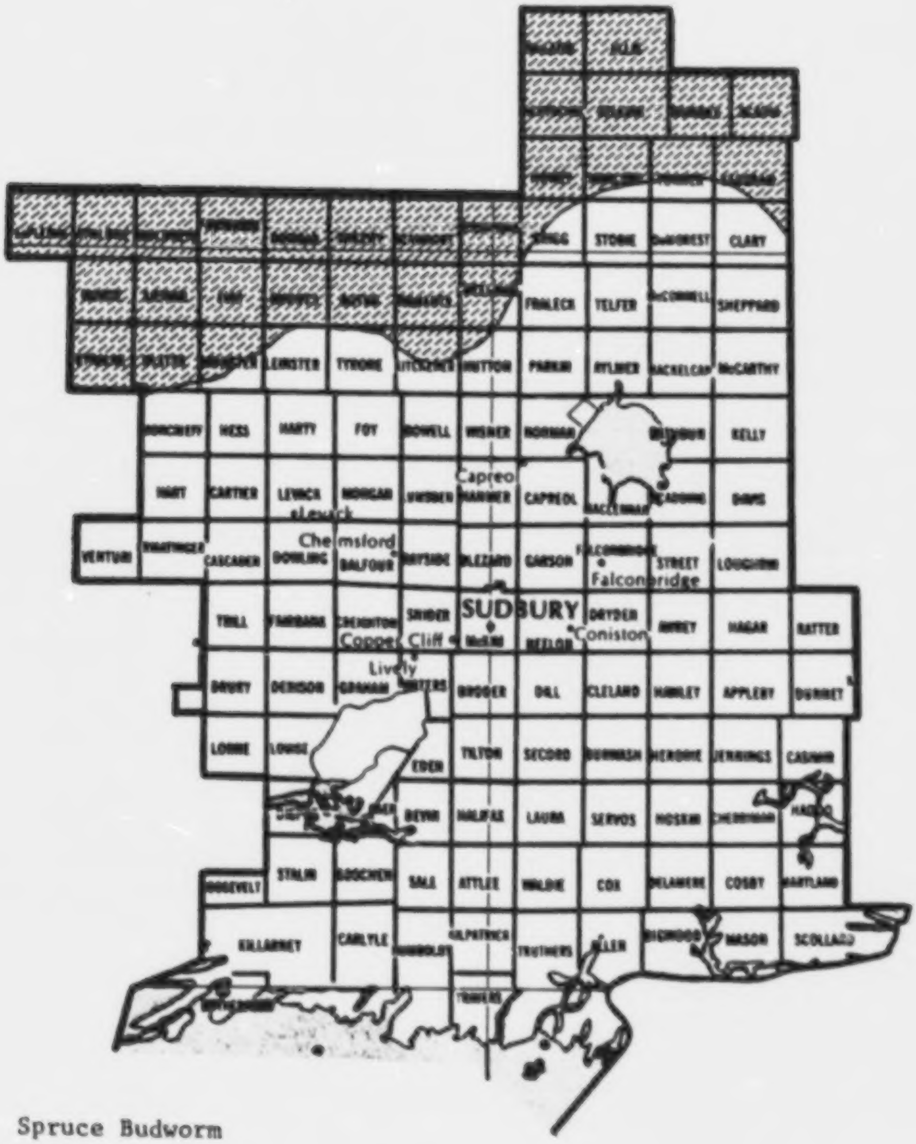
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which balsam fir
whole tree and top mortality
occurred in 1979

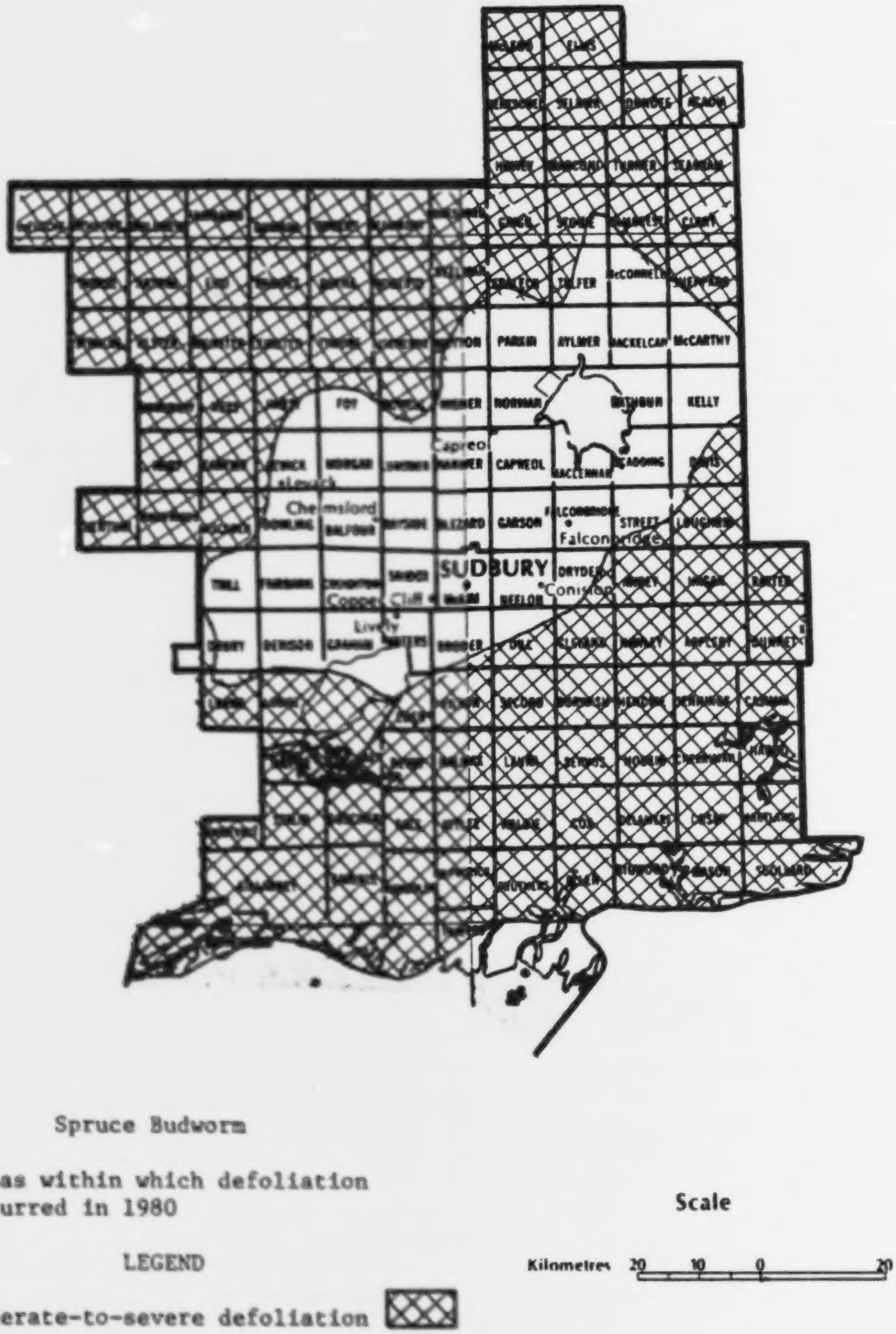
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which defoliation occurred in 1980

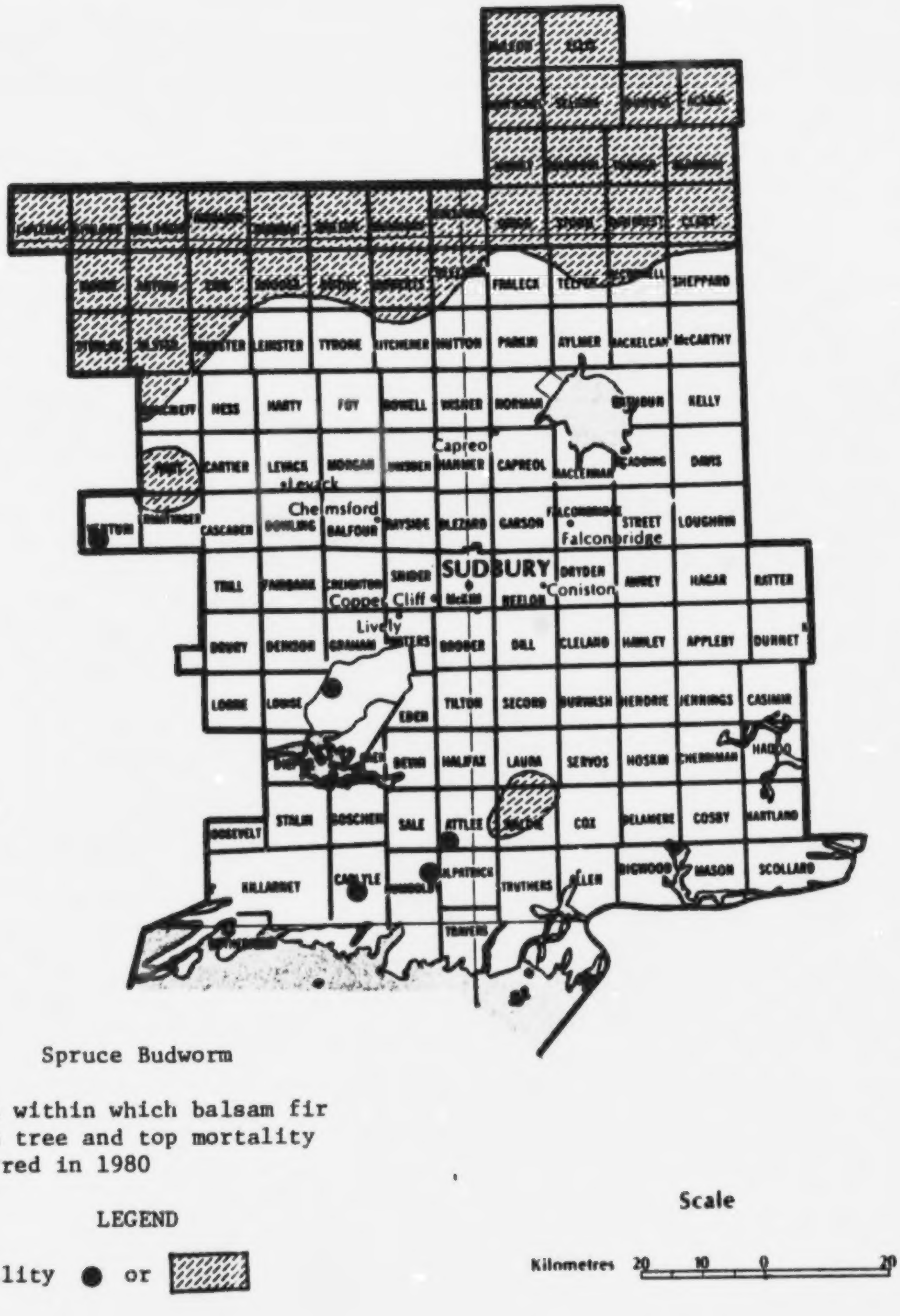
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1980

LEGEND

Mortality ● or ▨

Scale

Kilometres 20 10 0 20

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

Host(s): jP, rP, scP [Major]

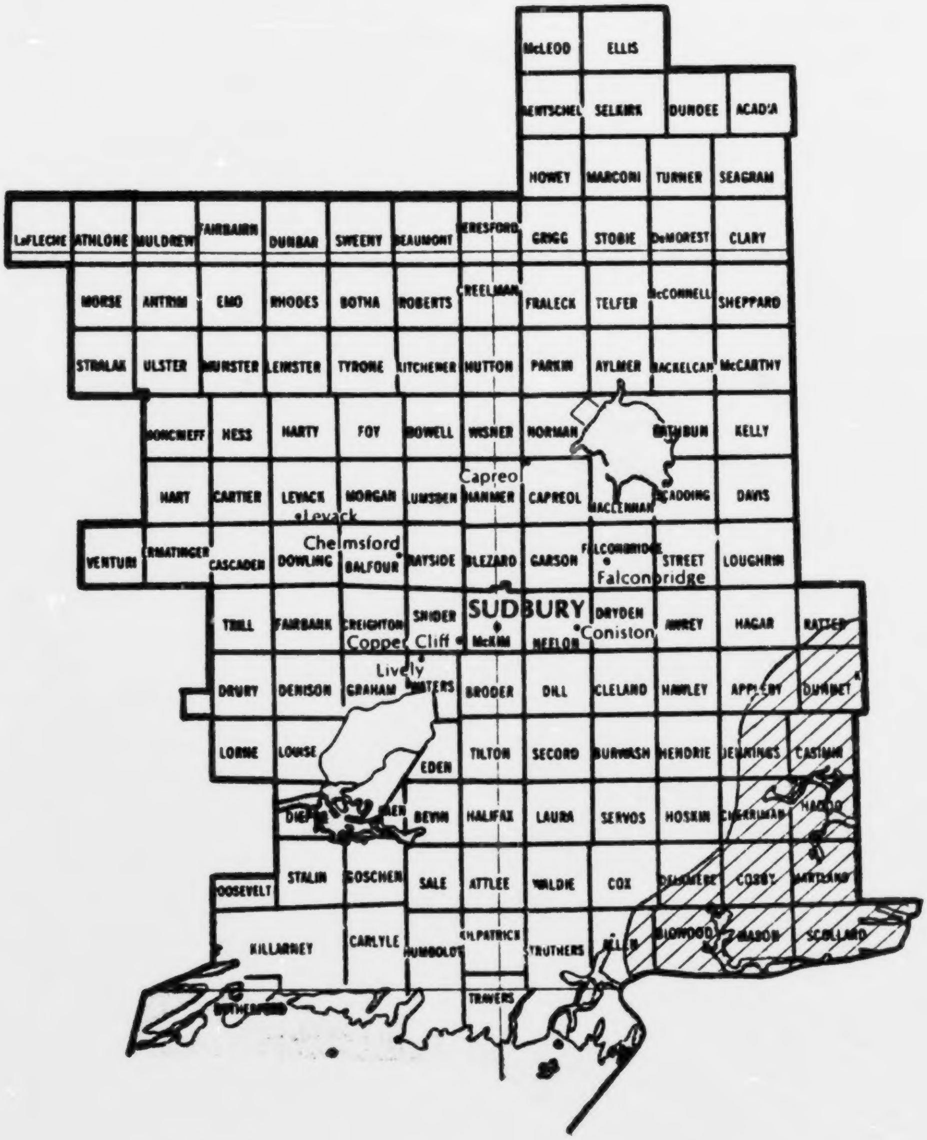
Year	Remarks
1950	single collections made in Lumsden and Bowell twps
1951-1956	not reported
1957	larvae found in small numbers
1958	numerous larvae in Cox Twp
1959	small numbers of larvae found at each sample point
1960	few larvae found
1961	few larvae found
1962-1964	not reported
1965	Light infestations were recorded in Rathburn, Aylmer, Hanmer and Moncrieff twps.
1966	Light infestations were observed in many jack pine stands throughout the district.
1967	light defoliation on jack pine trees in Cascaden Twp
1968	Pockets of moderately to severely defoliated jack pine trees were observed in Allen Twp near Hartley Bay and a band of light infestation was observed in the southeast corner of the district between Ratter Twp and the French River (see map, page 53).
1969	A light infestation persisted for a second year along the French River, and approximately 254 km^2 of moderate-to-severe defoliation occurred along the shore of the French River in Travers, Allen, Bigwood and Scollard twps (see map, page 54).
1970	Expansions, primarily in Allen and Bigwood twps, enlarged the previous year's infestation of 254 km^2 to approximately 363 km^2, and a new area of light infestation (covering approx. 207 km^2) was mapped in portions of Jennings, Cherriman, Hoskin and Cosby twps (see map, page 55). Light tree mortality was noted at Hartley Bay (see map, page 56).

(cont'd)

Jack Pine Budworm, *Choristoneura pinus pinus* Free. (concl.)

Year	Remarks
1971	There was a general decline in populations. In the French River area, the total area of moderate-to-severe defoliation declined from 363 km^2 in 1970 to 212 km^2 in 1971 (see map, page 57). Populations dropped to endemic levels in the Cherriman and Humboldt-Travers area of the district. Mortality was observed near the French River (see map, page 58).
1972	The 1971 infestation in the French River area collapsed to endemic levels.
1973-1976	not reported
1977	small numbers in Rhodes Twp
1978-1980	not reported

SUDBURY DISTRICT



Jack Pine Budworm

Areas within which defoliation occurred in 1968

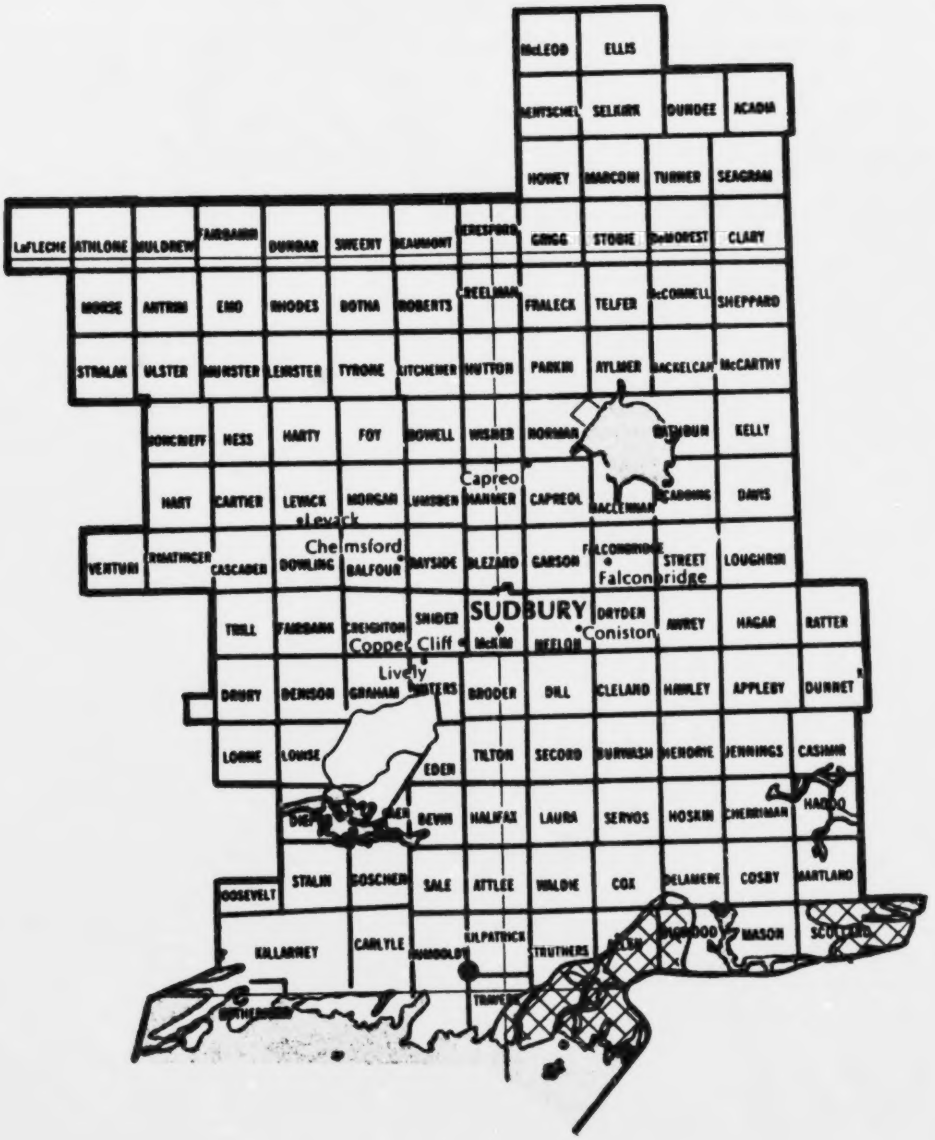
LEGEND

Light defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Jack Pine Budworm

Areas within which defoliation
occurred in 1969

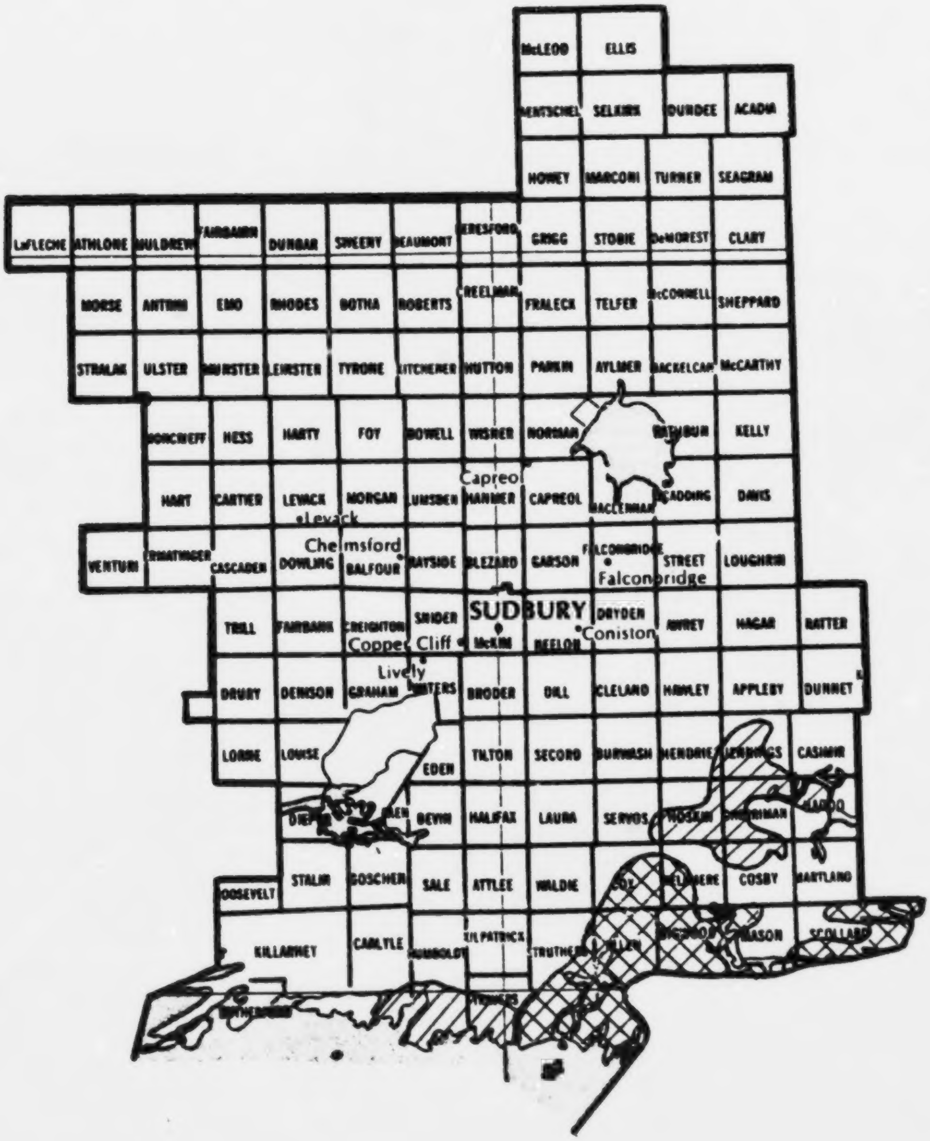
Scale

LEGEND

Kilometres 20 10 0 20

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Jack Pine Budworm

Areas within which defoliation occurred in 1970

LEGEND

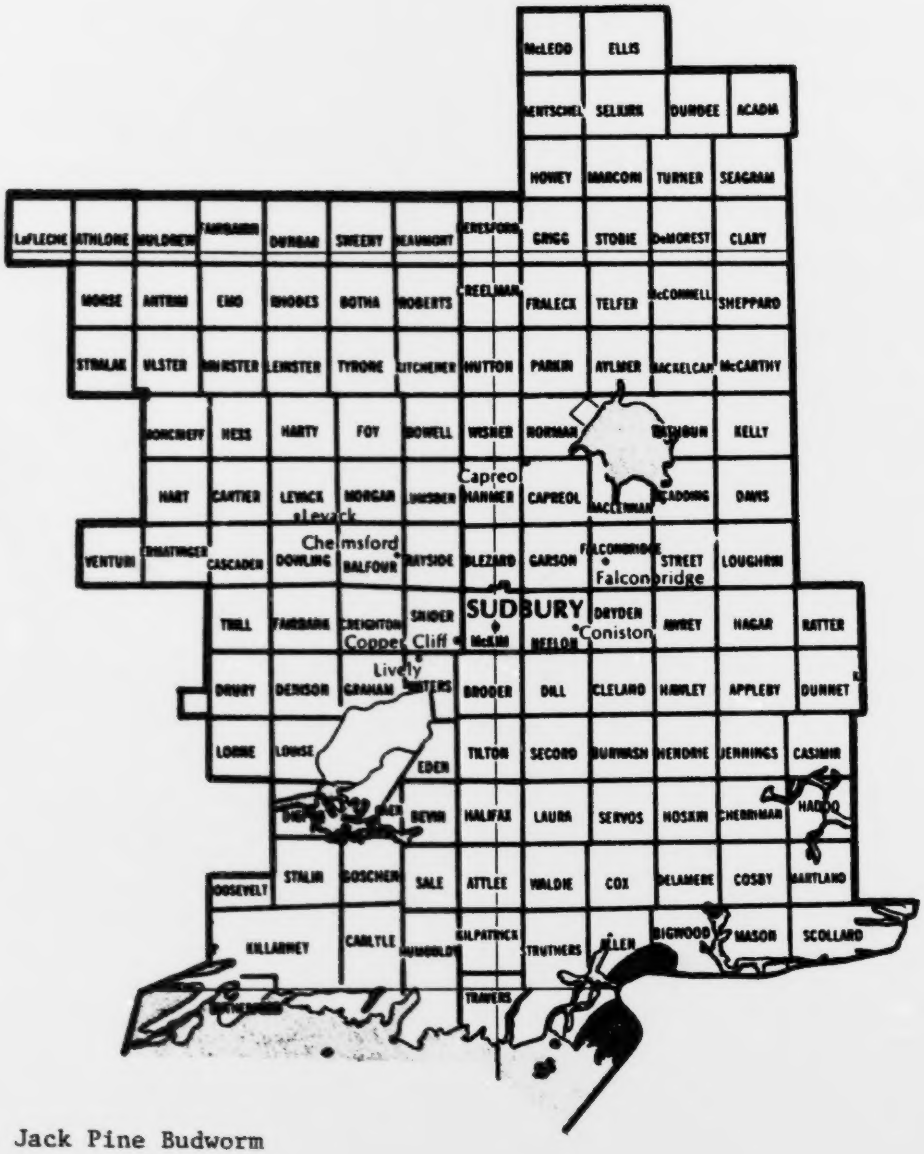
Light defoliation ▨

Moderate-to-severe defoliation ▩

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Jack Pine Budworm

Areas within which whole tree and top mortality occurred in 1970

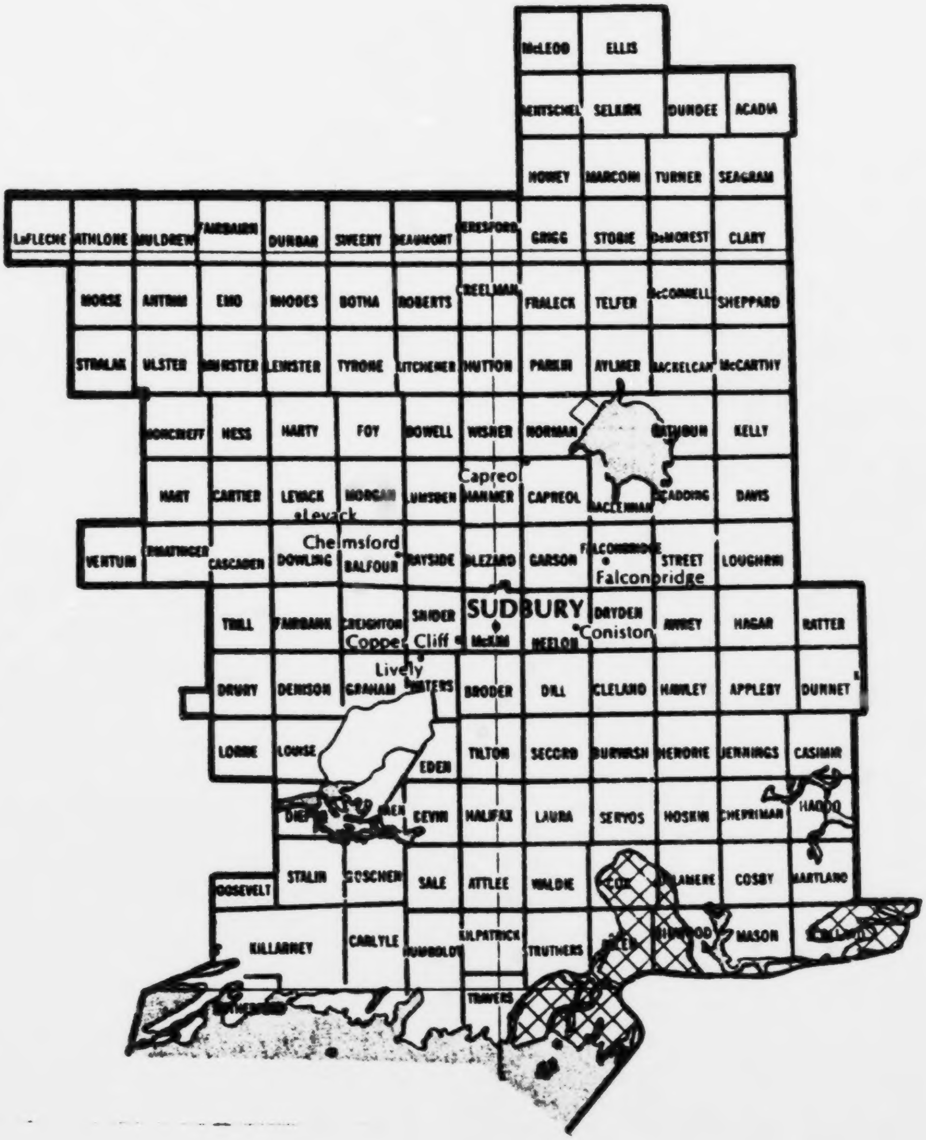
LEGEND

Mortality ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Jack Pine Budworm

Areas within which defoliation occurred in 1971

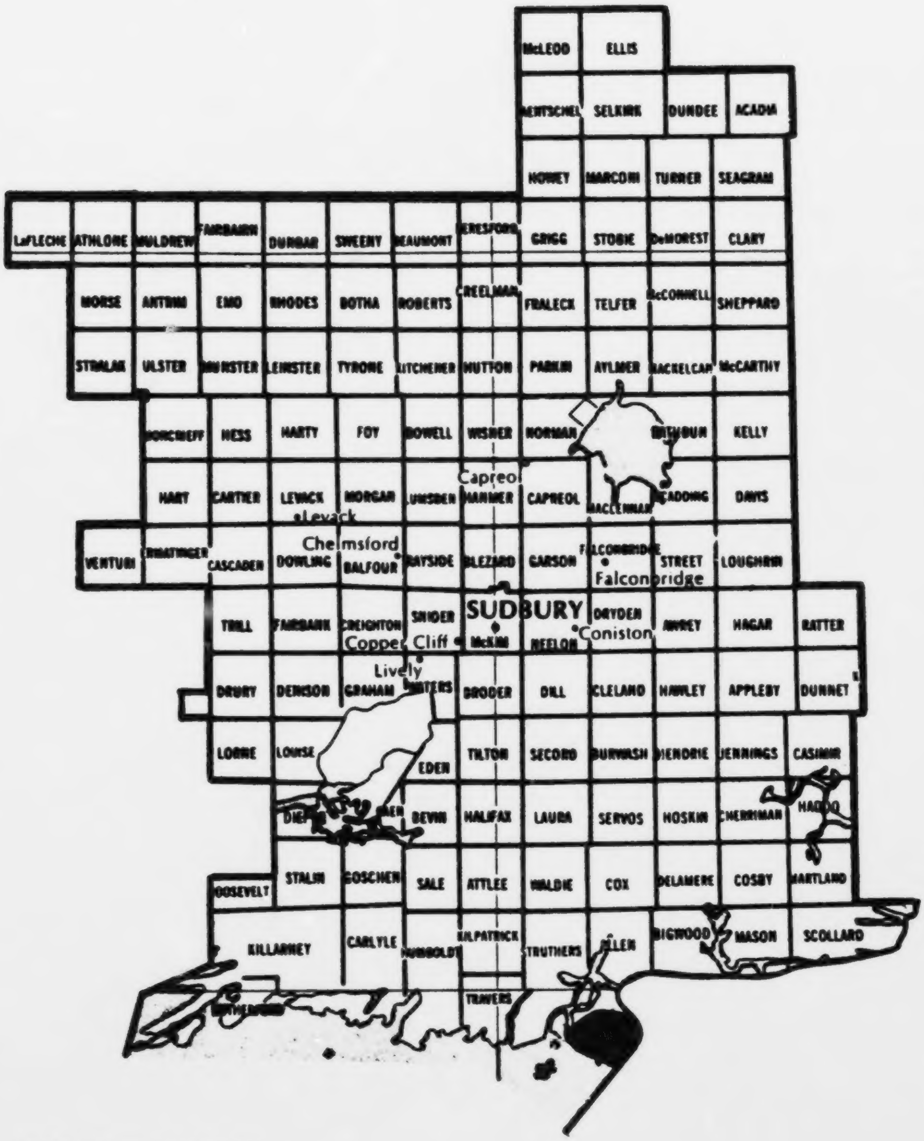
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Jack Pine Budworm

Areas within which whole tree and
top mortality occurred in 1971

LEGEND

Mortality ●

Scale

Kilometres 20 10 0 20

Larch Casebearer, *Coleophora laricella* Hbn.

Host(s): larch [Major]

Year	Remarks
1950-1952	not reported
1953	low populations in Denison Twp
1954	low populations in Hagar Twp
1955-1956	not reported
1957	low populations in Secord and Bigwood twps
1958	notable increases in larval numbers in Trill, Dill and Bigwood twps
1959-1969	low populations
1970	Low populations persisted. Moderate numbers were reported in Dill Twp.
1971-1972	low populations
1973-1978	not reported
1979	Pockets of light infestation occurred at widely scattered points.
1980	low populations

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.)

Host(s): maple [Major]

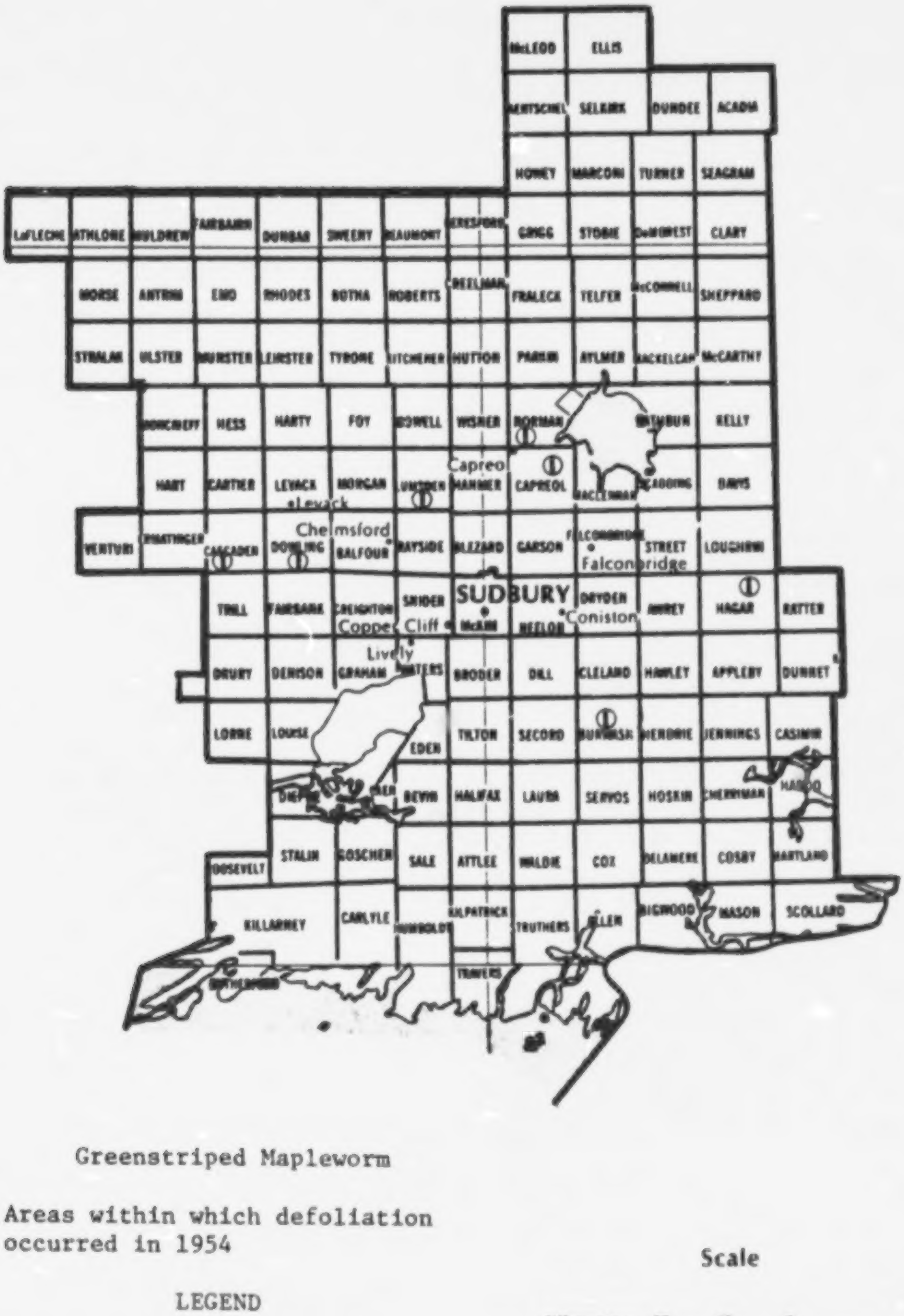
Year	Remarks
1950	low populations found in MacLennan, Sweeny and Dowling twps
1951-1952	not reported

(cont'd)

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.) (concl.)

Year	Remarks
1953	low populations in Falconbridge and Lumsden twps
1954	Heavy defoliation occurred in seven townships in the district (see map, page 61).
1955	moderate-to-severe defoliation of understory red maple in Burwash Twp and light at several locations elsewhere in the district (see map, page 62)
1956	Heavy infestations occurred in Waters, Dill and Burwash twps. Light infestations were reported at widely scattered points (see map, page 63).
1957	not reported
1958-1960	light defoliation in Waters, Dill and Burwash twps
1961	trace levels reported
1962	scattered colonies in Secord Twp
1963-1970	not reported
1971	A heavy infestation occurred at Tyson Lake in Humboldt Twp; approximately 20 km^2 of red maples were defoliated.
1972	Population declined and defoliation was light at Tyson in Humboldt Twp.
1973	A sharp increase in populations resulted in moderate-to-severe defoliation of maple stands throughout an area of approximately 103 km^2 in the Tyson Lake area. The infested area along Highway 637 extended from Mahrenazing River south to Indian Reserve No. 3 where defoliation ranged from 60 to 80%.
1974	comparable to 1973 populations (see map, page 64)
1975	light infestations reported in Dill and Humboldt twps
1976	low numbers reported in Humboldt Twp
1977-1980	not reported

SUDBURY DISTRICT



Greenstriped Mapleworm

Areas within which defoliation occurred in 1954

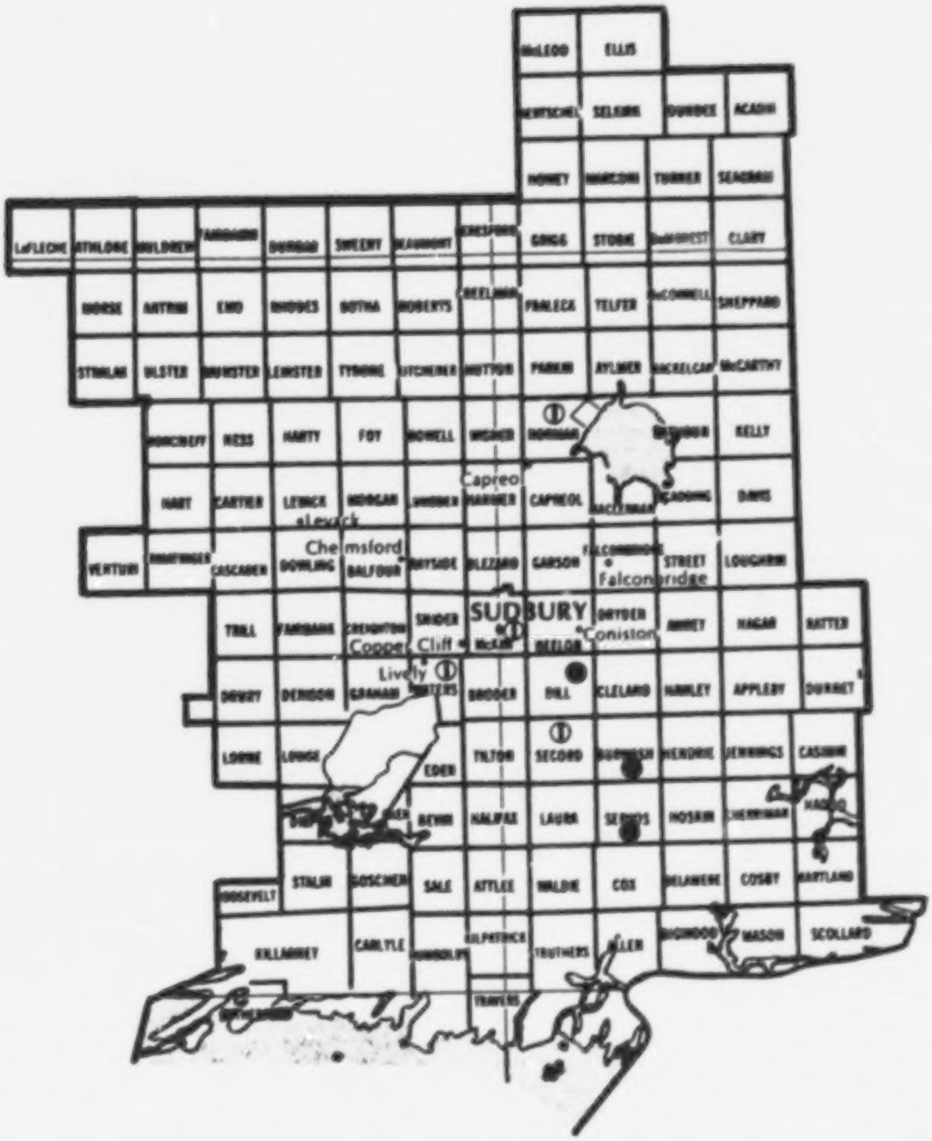
LEGEND

Light defoliation ⦶

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Greenstriped Mapleworm

Areas within which defoliation occurred in 1955

LEGEND

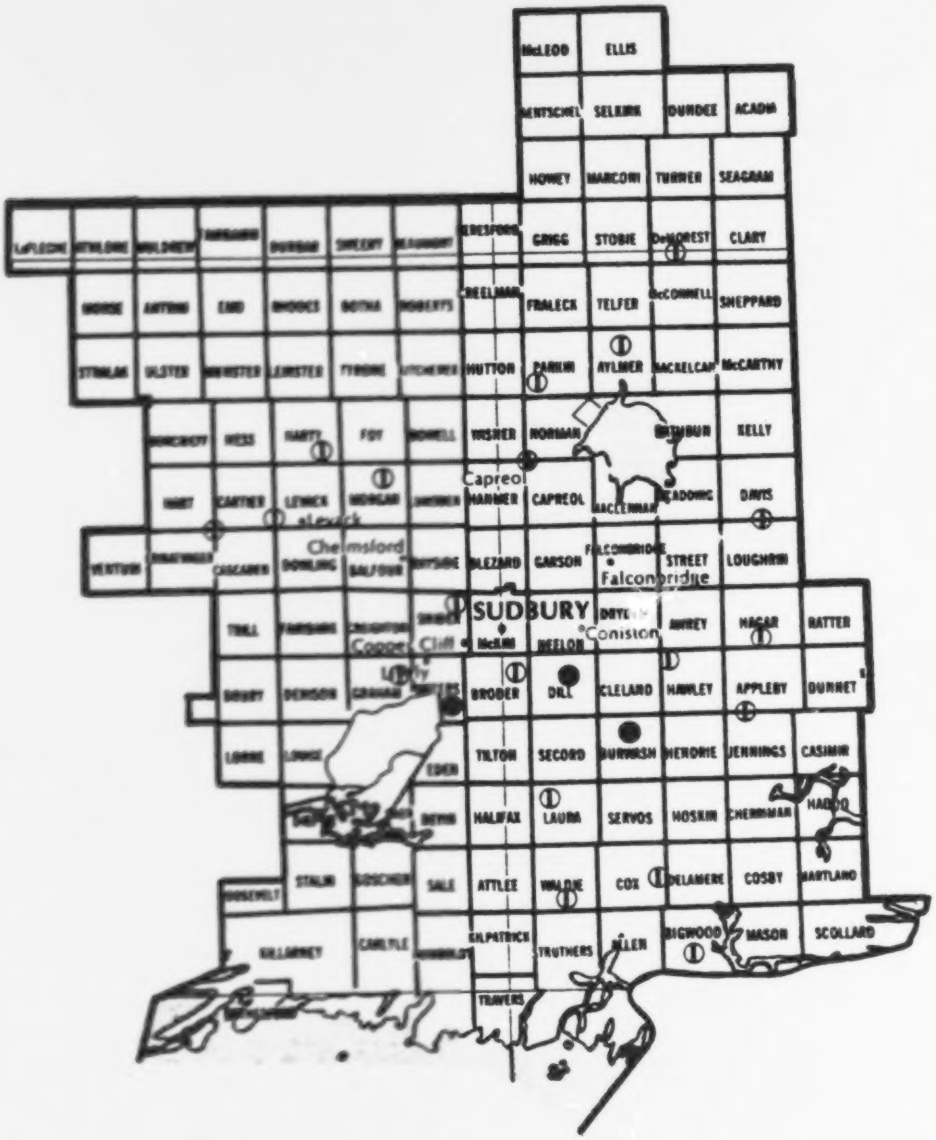
Light defoliation ⦶

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Greenstriped Mapleworm

Areas within which defoliation
occurred in 1956

LEGEND

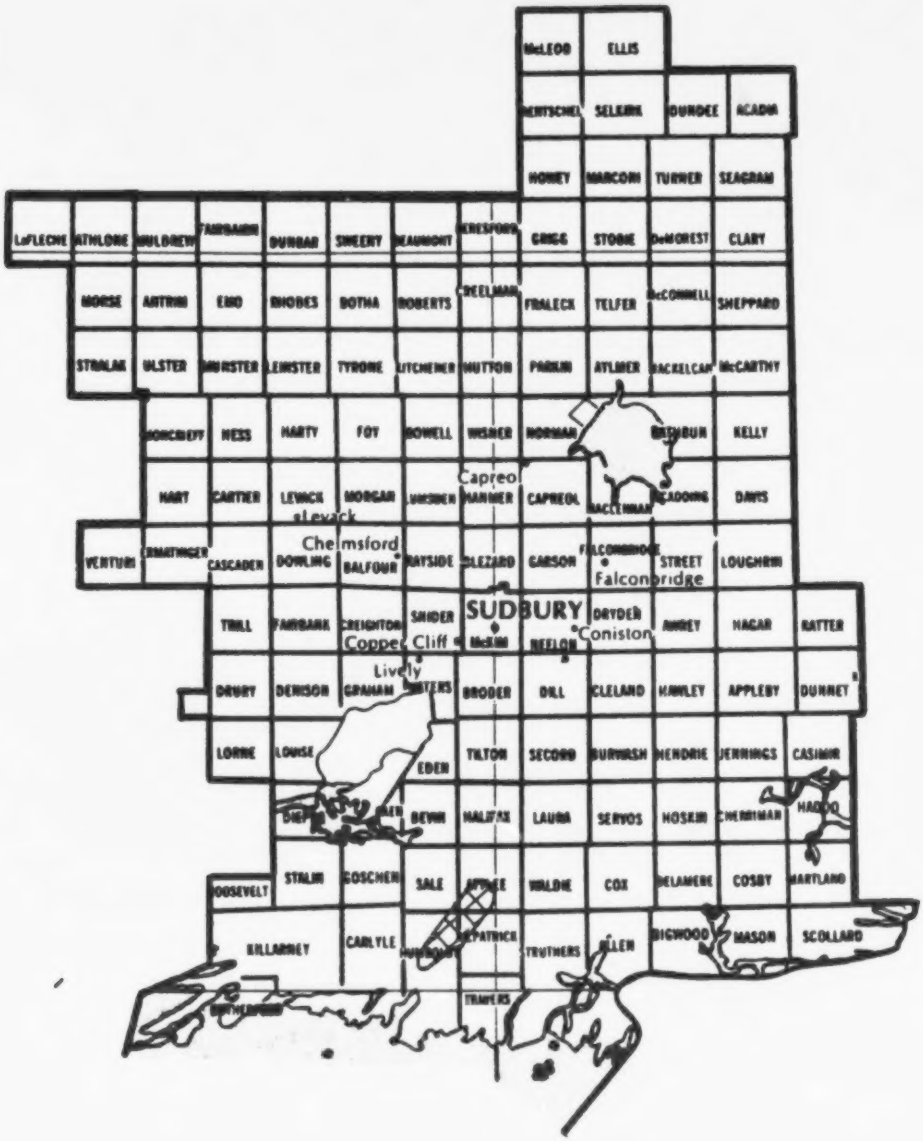
Light defoliation Ⓘ

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Greenstriped Mapleworm

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ☒

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Host(s): pine [Major]

Year	Remarks
1950-1956	not reported
1957	numerous infested shoots observed in Hanmer Twp
1958	trace populations reported in Morgan Twp
1959-1960	trace populations found at widely scattered points
1961	an average of 8% leader damage in Hart and Norman twps
1962	Leader damage increased from 8% to 16% in Hart and Norman twps.
1963	comparable to 1962 levels
1964	caused 23% leader damage in Norman Twp and 4% in Hart Twp
1965	A decline in populations occurred in Norman and Hart twps.
1966	Trace populations occurred at widely scattered points.
1967-1976	not reported
1977	small numbers of infested shoots reported in Burwash Twp
1978-1980	not reported

Birch Leafminer, *Fenusa pusilla* (Lep.)

Host(s): birch [Major]

Year	Remarks
1950-1953	not reported

(cont'd)

Birch Leafminer, *Fenusa pusilla* (Lep.) (cont'd)

Year	Remarks
1954-1955	light infestation in McKim Twp
1956	not reported
1957	Pockets of moderate-to-severe defoliation occurred in small, open-grown white birch trees in Waters, McKim and Broder twps.
1958	Moderate-to-severe leaf mining was observed on small trees in Cherriman Twp and light damage in Waters, McKim and Broder twps.
1959	comparable to 1958
1960	light leaf mining at scattered locations
1961	moderate-to-severe leaf mining in four townships near the city of Sudbury and light infestations observed at scattered locations throughout the remainder of the area
1962	Pockets of light and moderate-to-severe leaf mining occurred at widely scattered locations.
1963	moderate-to-severe leaf mining on reproduction at scattered points along Hwy 67
1964-1965	moderate-to-severe damage to small, open-grown trees around the city of Sudbury and along Hwy 69
1966-1967	moderate-to-severe leaf mining throughout the southern part of the district and scattered pockets of light and moderate-to-severe mining in the northern part
1968	occurred commonly in low numbers throughout the district
1969	low populations in Cartier and Dill twps
1970-1971	low populations at widely scattered points in the district
1972	Moderate-to-severe infestations were present in Burwash, Cosby and Norman twps.

(cont'd)

Birch Leafminer, *Fenusa pusilla* (Lep.) (concl.)

Year	Remarks
1973	light damage in the Chelmsford area
1974	moderate-to-severe defoliation along the Veuve River, west of the village of Hagar and light defoliation in Rayside Twp
1975	comparable to 1974
1976	not reported
1977	moderate-to-severe defoliation in Hagar and Dunnet twps
1978-1980	low population levels reported at widely scattered locations

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Host(s): deciduous [Major]

Year	Remarks
1950	moderate-to-severe defoliation was reported throughout Lorne and Louise twps. A new medium-to-heavy infestation occurred over 371.52 km^2 in the Jamot and Noelville areas and a small pocket covering 2.58 km^2 occurred in McCarthy Twp (see map, page 71).
1951	Populations increased from Trill Twp north to Hess Twp and east along the north shore of Lake Wanapitei to McCarthy Twp. North of these areas pockets of moderate-to-severe damage were found in Muldrew, Howey and Fairbairn twps (see map, page 72).
1952	continued to increase in the district (see map, page 73)
1953	declined in the southern portion of the district but persisted and spread in the northern parts and southeast to McCarthy Twp (see map, page 74)

(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (cont'd)

Year	Remarks
1954	Populations virtually disappeared in the southwestern part of the district. Moderate-to-severe defoliation continued over most of the Sudbury District, north and west of Lake Wanapitei and into the Gogama District. Moderate-to-severe defoliation was also reported in the southeastern portion (see map, page 75).
1955	There was a notable decline in the district. Approximately 258 km^2 of moderate-to-severe defoliation occurred in the Whitefish-Worthington area (see map, page 76).
1956	Infestations completely collapsed.
1957-1959	not reported
1960	Moderate-to-severe defoliation reported around the west end of Whitewater Lake extended northwest and southwest in an area approximately 24 km long and 9.6 km wide. A band of light defoliation bordering the area of moderate-to-severe defoliation was observed north to Dowling, Balfour and Rayside twps and south to Graham, Waters and McKim twps (see map, page 77).
1961	The infestation reported at the west end of Whitewater Lake declined. Two small pockets of moderate-to-severe defoliation occurred in Snider Twp and a new pocket of moderate-to-severe defoliation in Graham Twp was reported (see map, page 78).
1962	The infestation continued to spread, especially in the southeastern part of the district. Moderate-to-severe defoliation occurred in Bigwood and parts of five other townships in the French River area (see map, page 79).
1963	Pockets of moderate-to-severe defoliation persisted along Hwy 17 in Graham Twp and along the north side of Whitewater Lake in Balfour and Rayside twps. Moderate-to-severe defoliation in the French River area increased and covered a total of 176 km^2 (see map, page 80).

(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (cont'd)

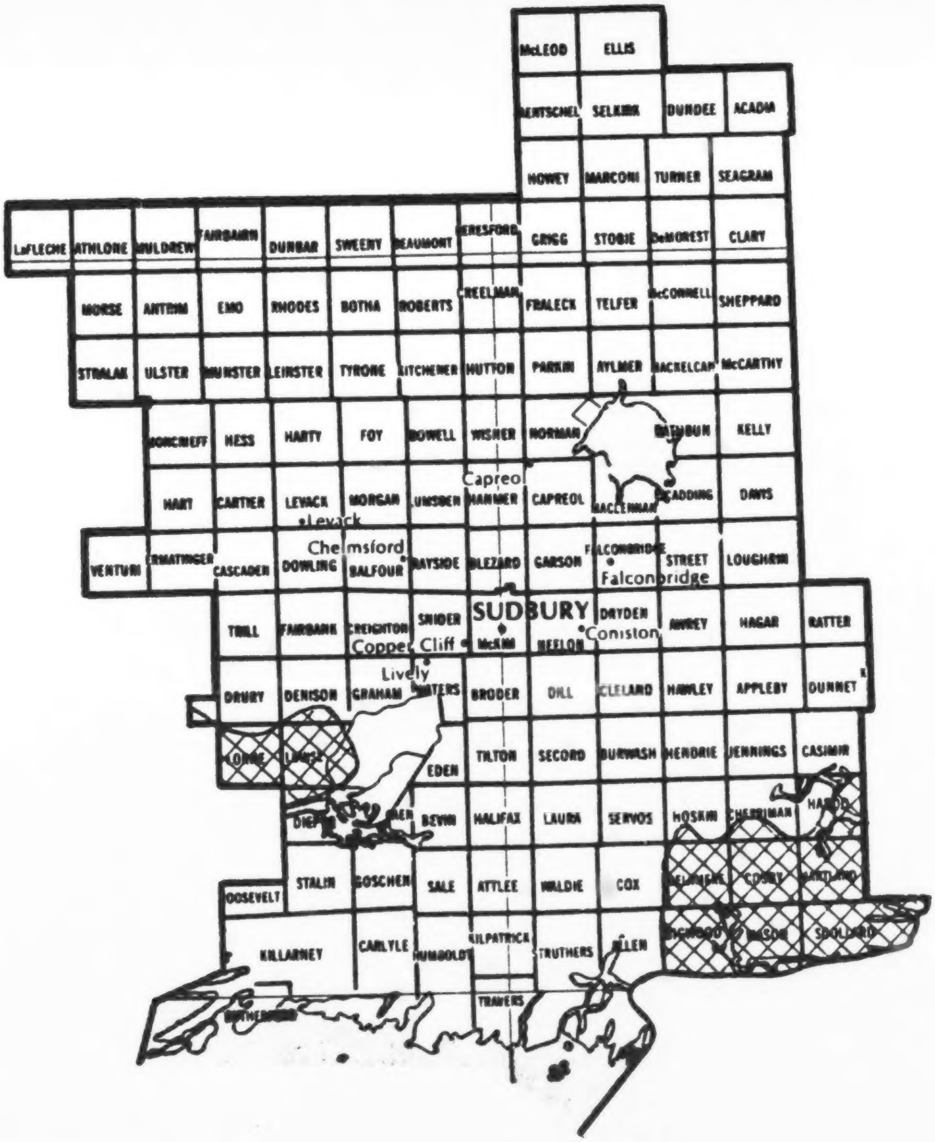
Year	Remarks
1964	There was no significant enlargement of infestations in the district (see map, page 81).
1965	Three small pockets of infestation coalesced to form a large area of moderate-to-severe defoliation surrounding the city of Sudbury. The medium-to-heavy infestation in the French River area spread eastward through Scollard Twp into the Parry Sound District and northward into Appleby Twp (see map, page 82).
1966	no significant change in area or extent of infestation (see map, page 83)
1967	Populations virtually disappeared except at Ramsay Lake, where there was light defoliation (see map, page 84).
1968	not reported
1969	light defoliation in the Copper Cliff area (see map, page 85)
1970-1972	not reported
1973	Areas of moderate-to-severe defoliation ranged in size from 202 to 12,120 ha at scattered locations within a 72.4 km radius of the city of Sudbury (see map, page 86).
1974	Moderate-to-severe defoliation occurred in the southeastern part of the Sudbury District, in the Chelmsford Valley area and in the Lake Panache area southwest of the city of Sudbury (see map, page 87).
1975	Moderate-to-severe defoliation was observed in the central and southwestern portions of the Sudbury District and areas to the southeast (see map, page 88).
1976	Moderate-to-severe defoliation continued in the district (see map, page 89).
1977	comparable to 1976 (see map, page 90)

(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (concl.)

Year	Remarks
1978	high populations reported in the central and southeast portions of the district (see map, page 91)
1979	A pocket of moderate-to-severe defoliation continued west of Sudbury (see map, page 92).
1980	Populations in Creighton Twp doubled in size; moderate-to-severe damage was reported between Hagar and Warren and extended into the North Bay District (see map, page 93).

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation
occurred in 1950

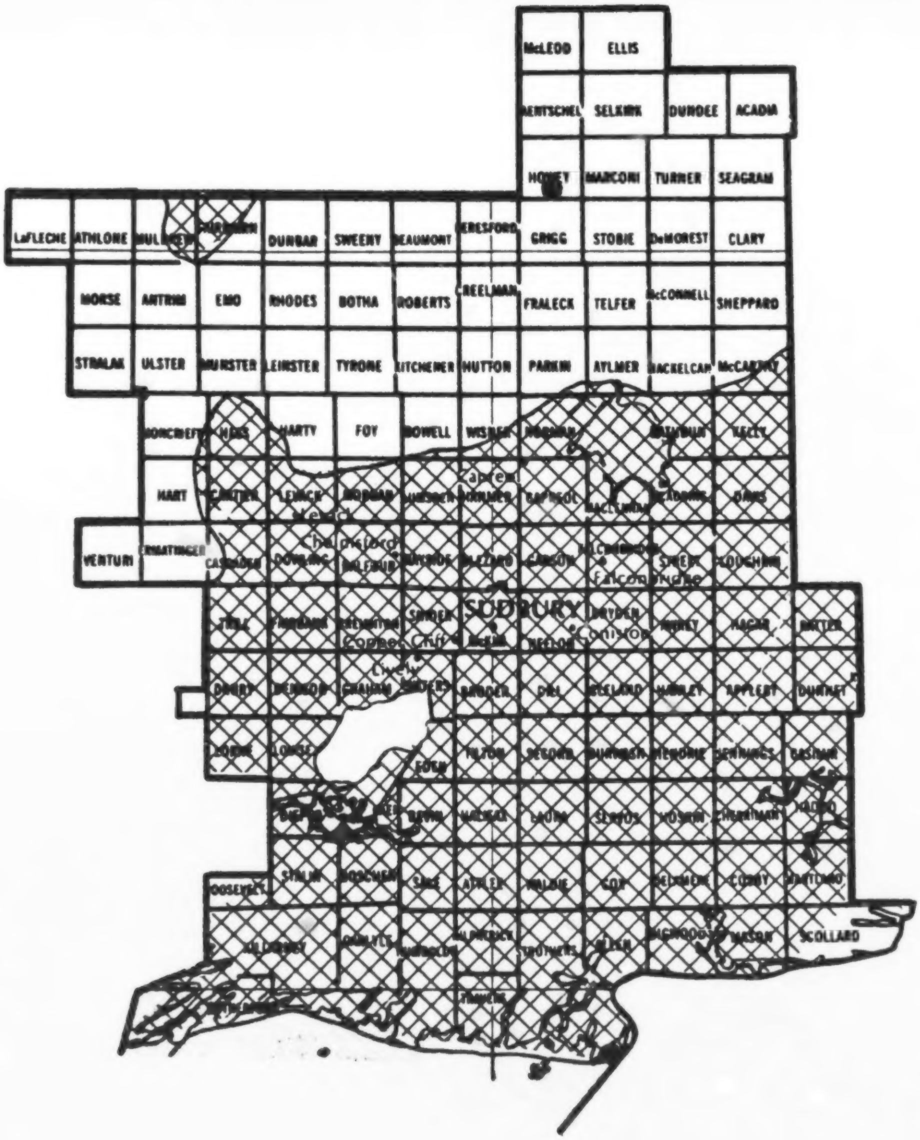
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1951

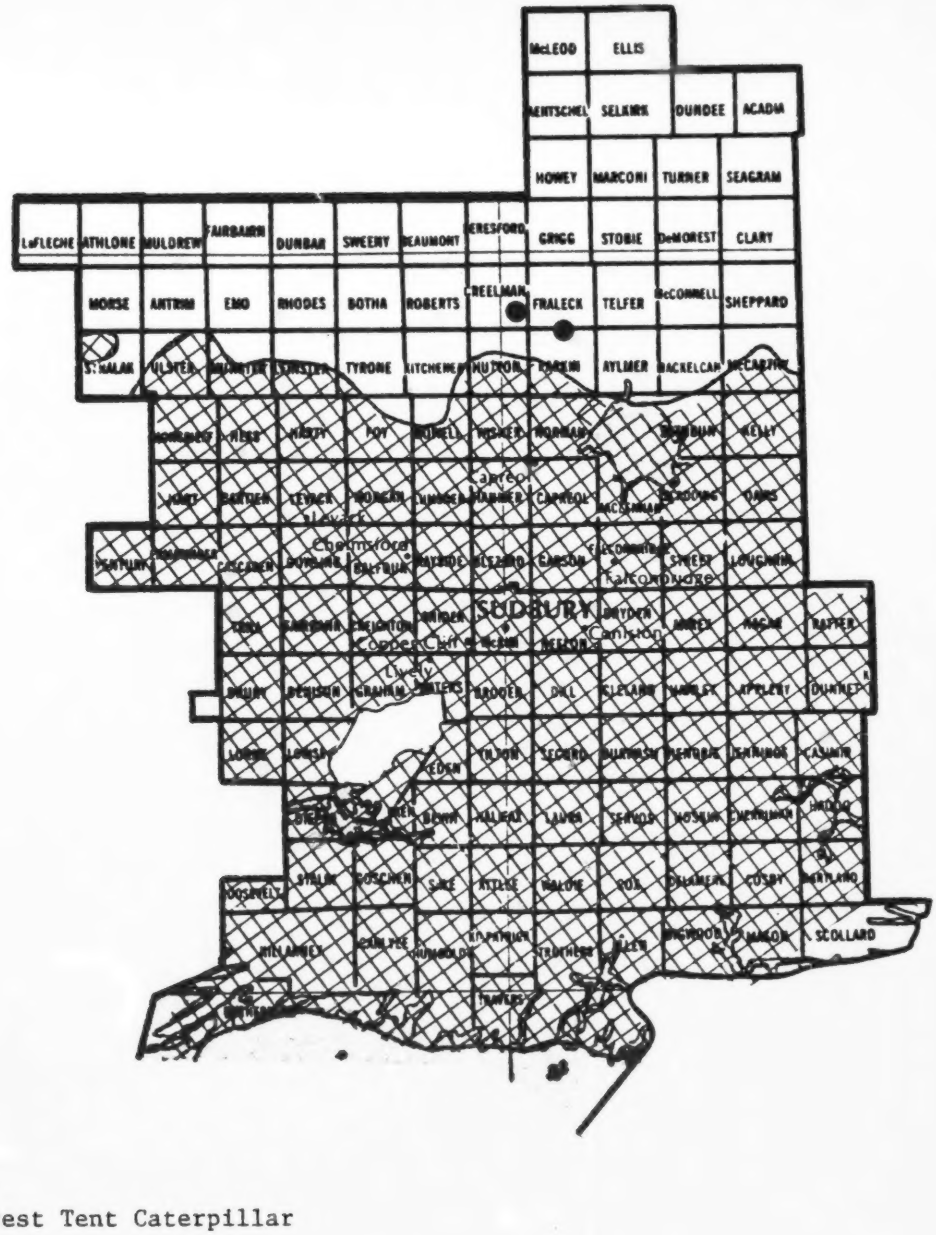
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

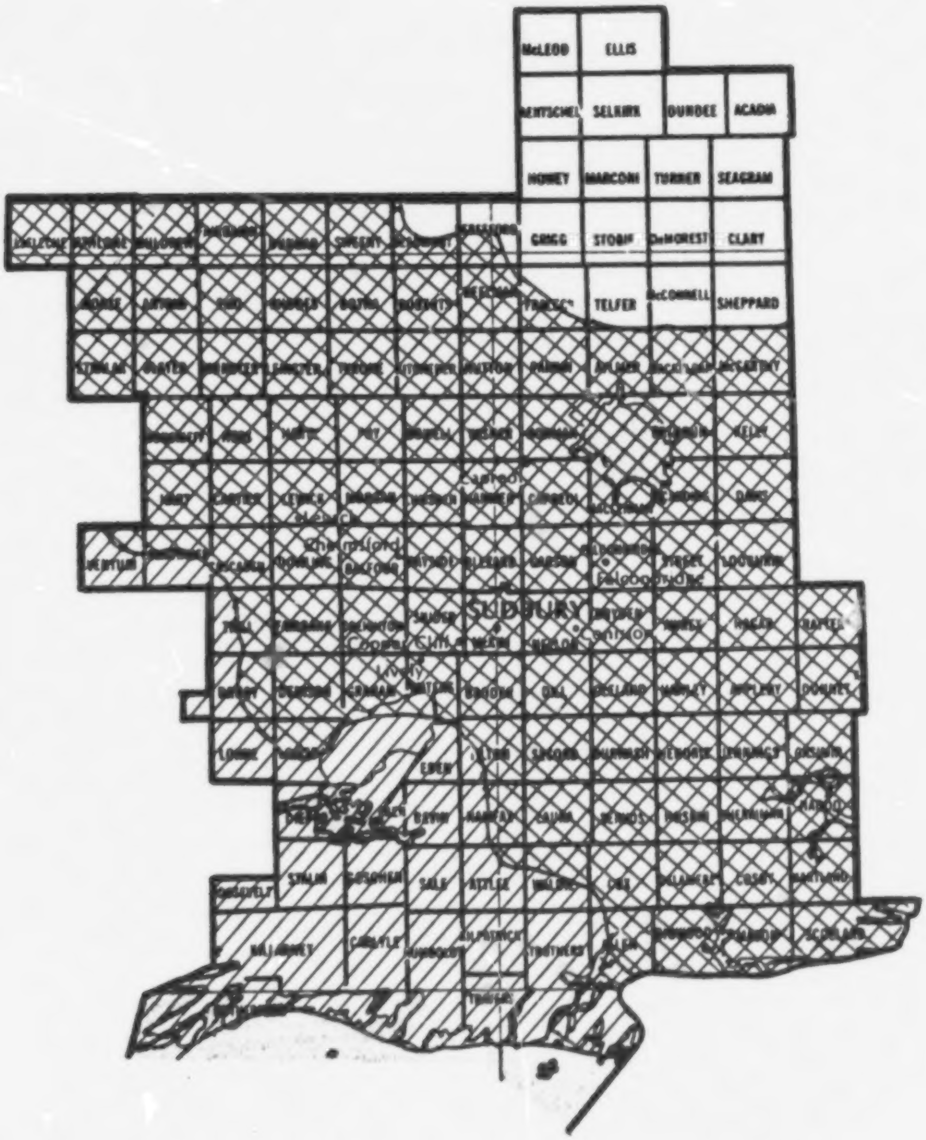
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

LEGEND

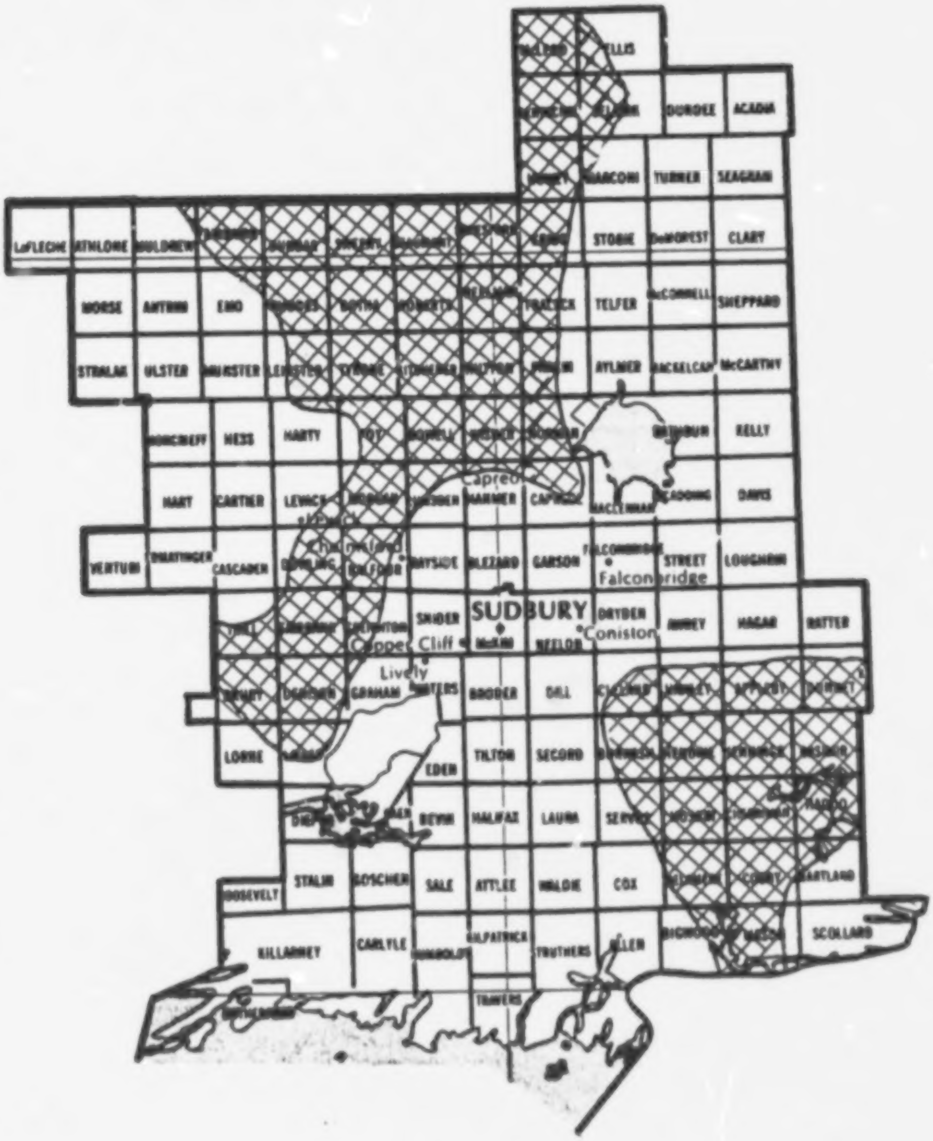
Light defoliation ▨

Moderate-to-severe defoliation ▩

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

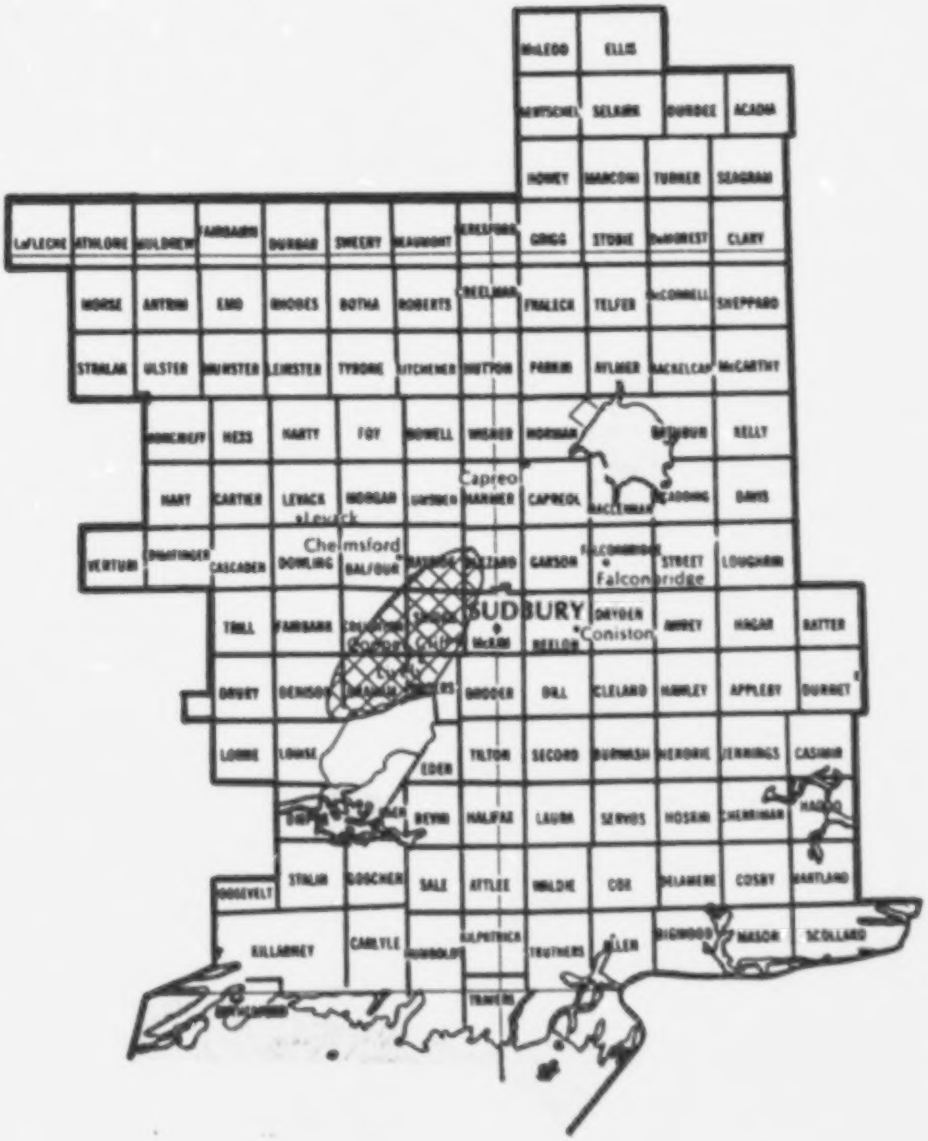
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1955

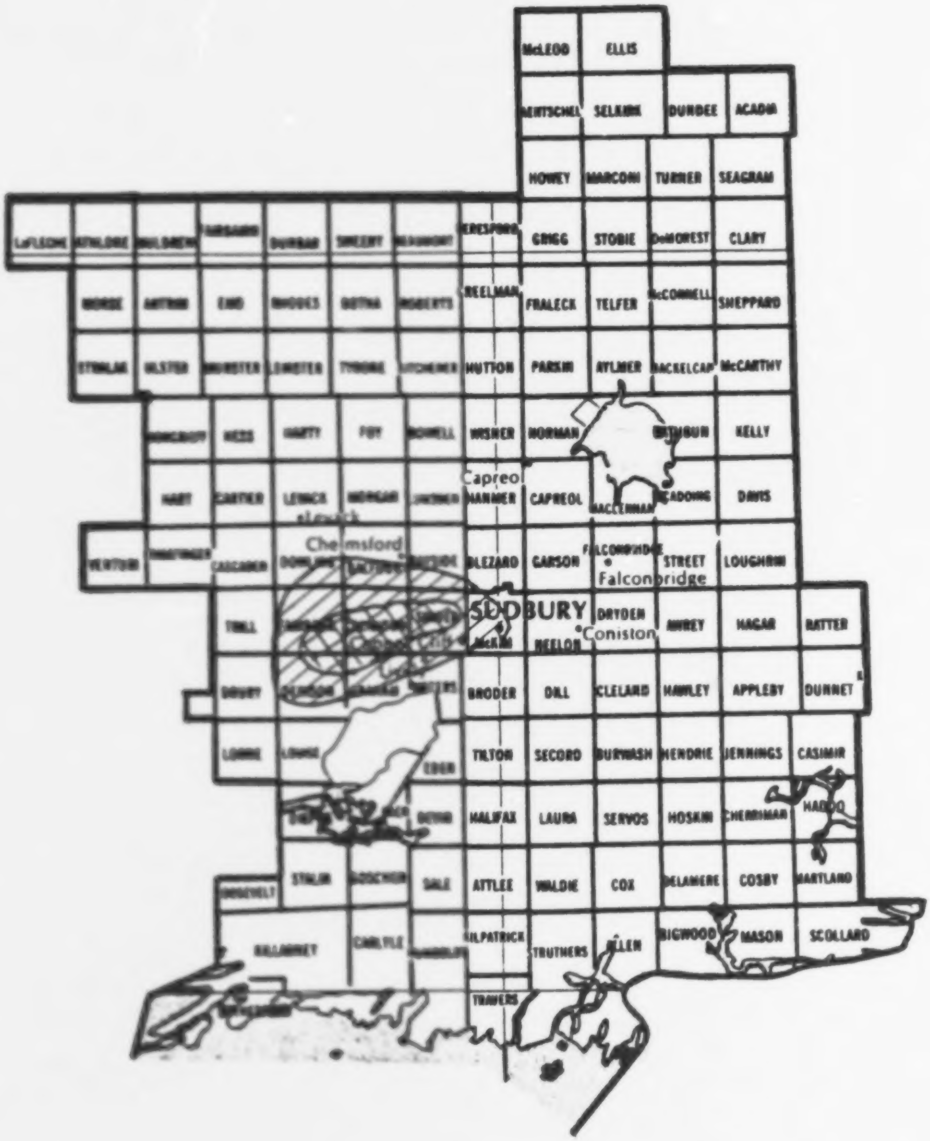
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1960

Scale

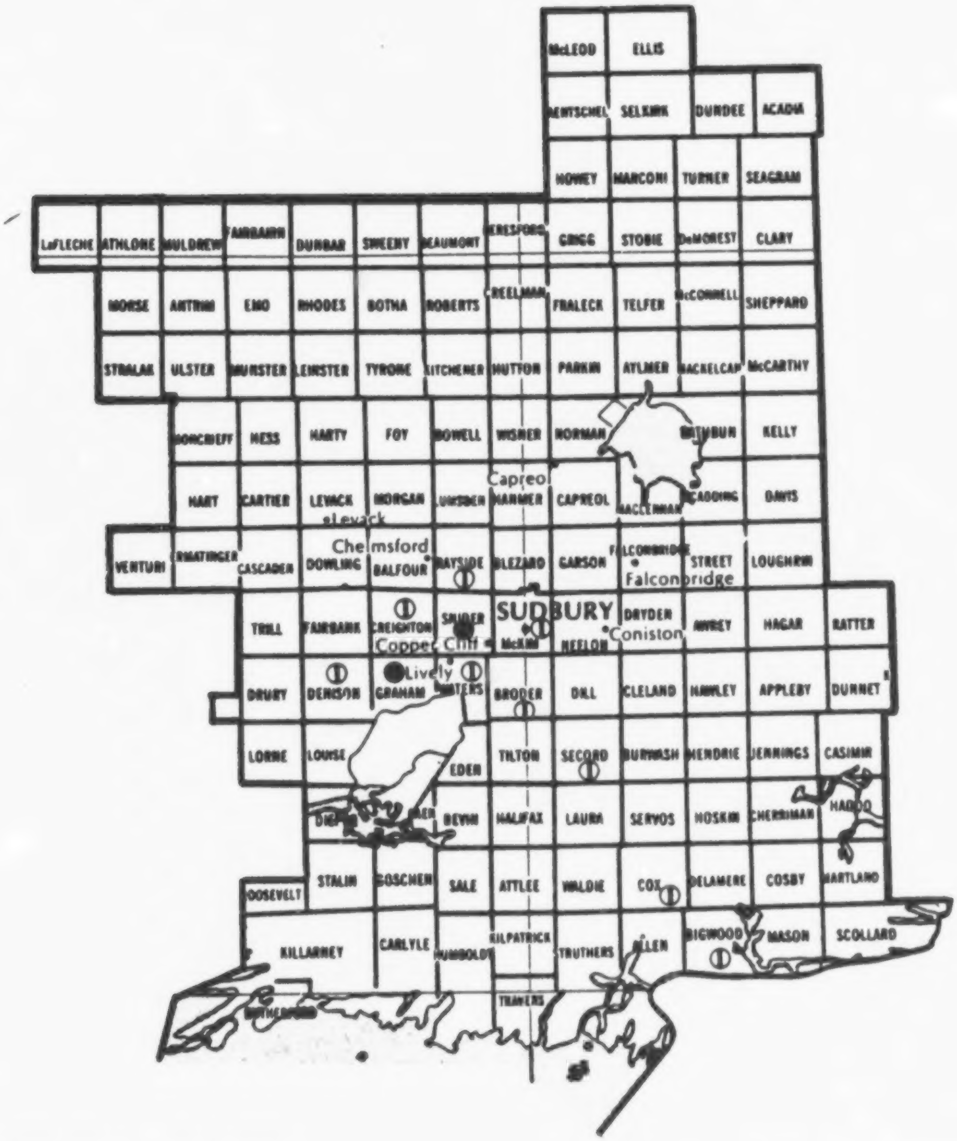
Kilometres 20 10 0 20

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1961

LEGEND

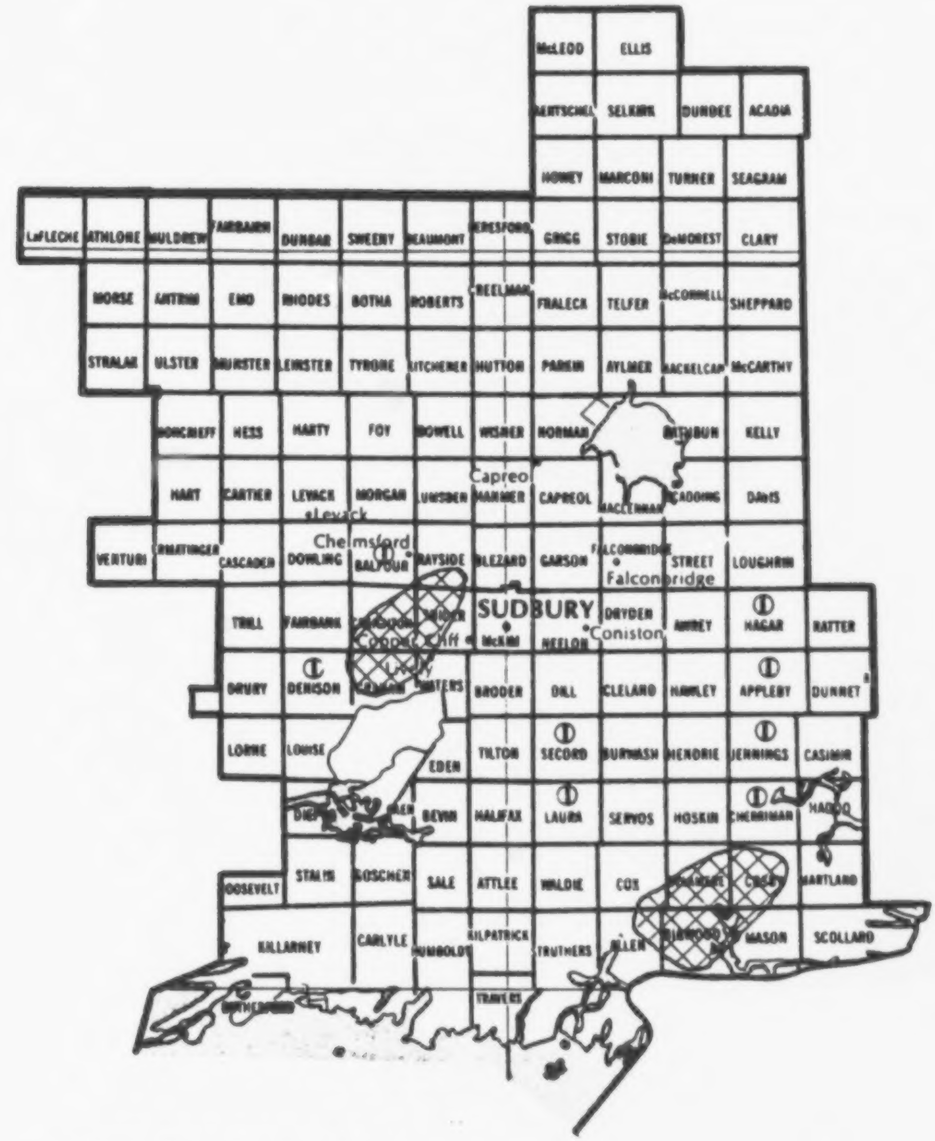
Light defoliation ◐

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1962

LEGEND

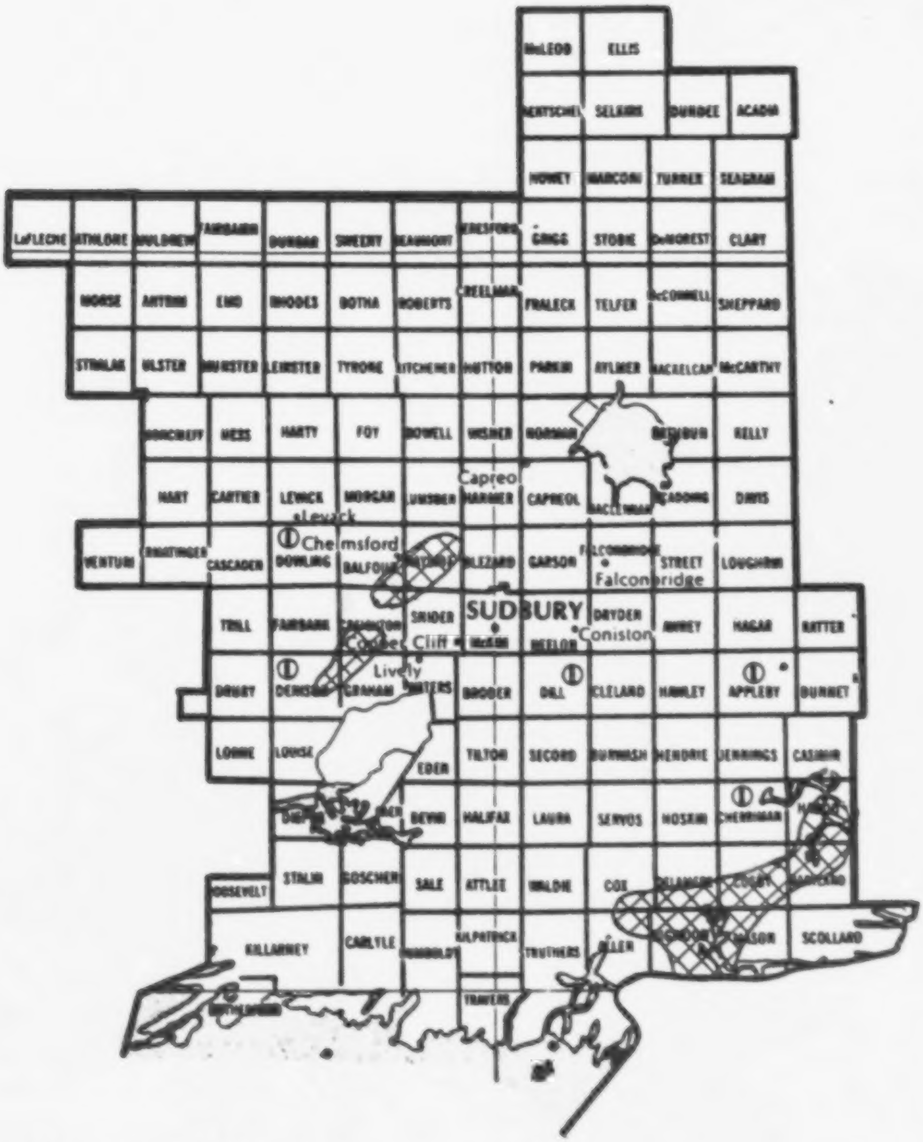
Light defoliation ⦶

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1963

LEGEND

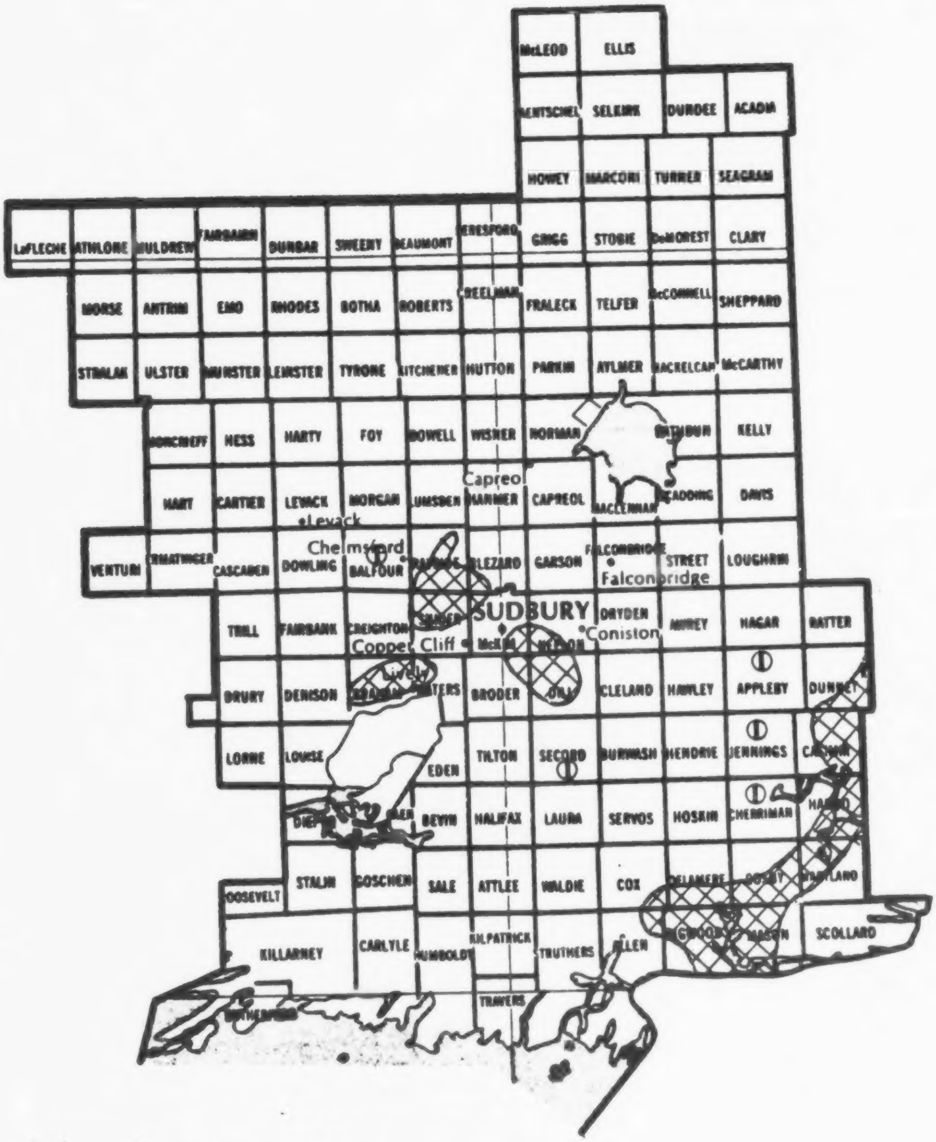
Light defoliation ①

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1964

LEGEND

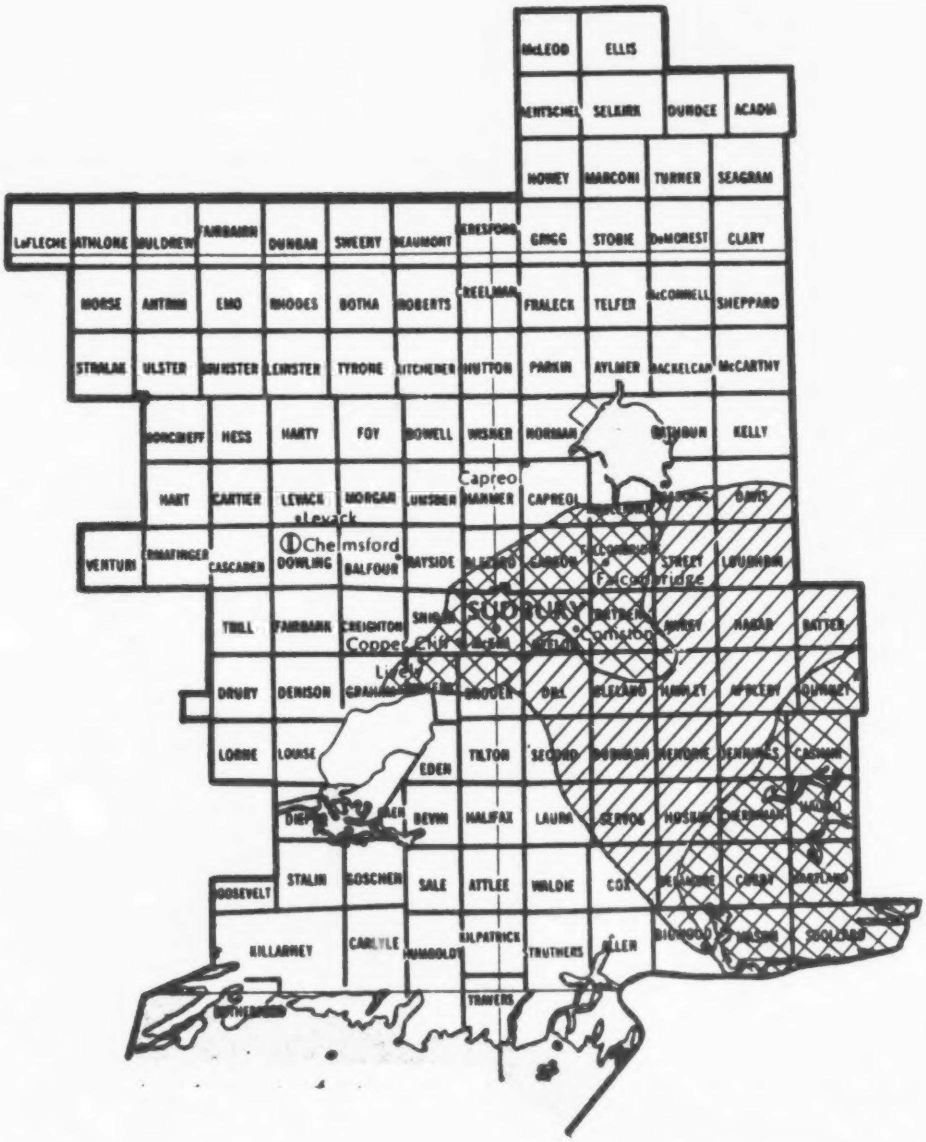
Light defoliation ⌽

Moderate-to-severe defoliation ▩

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1965

LEGEND

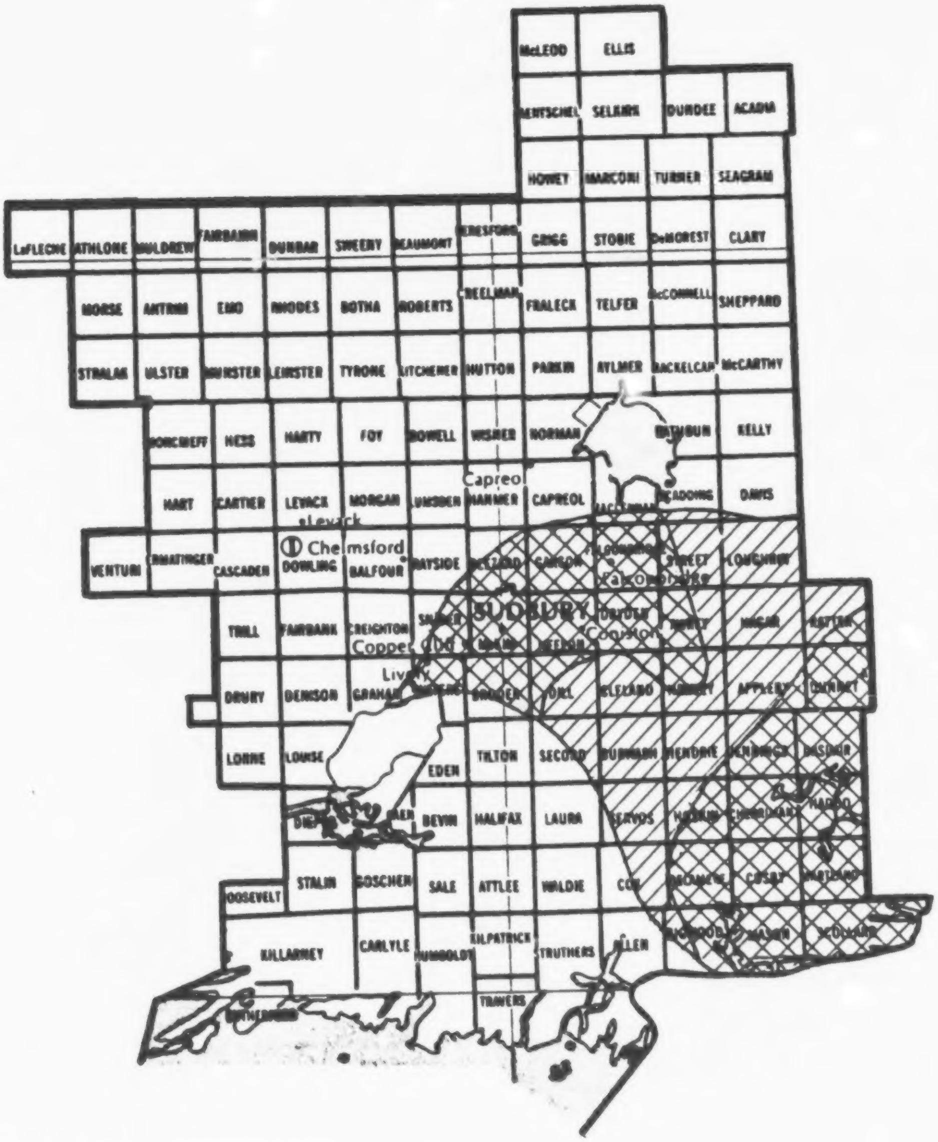
Light defoliation ① or ▨

Moderate-to-severe defoliation ▩

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1966

LEGEND

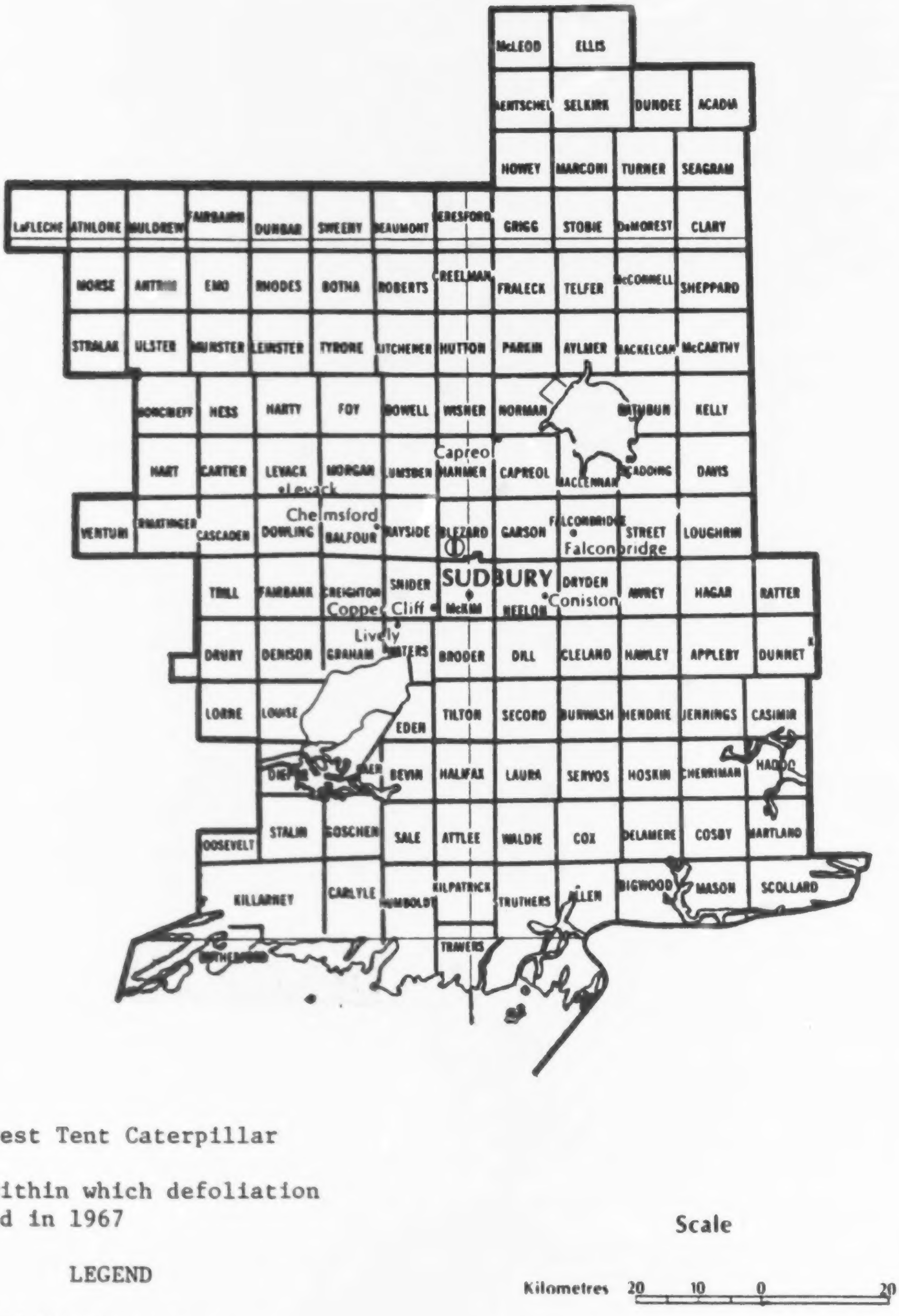
Light defoliation ▨

Moderate-to-severe defoliation ▩

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1967

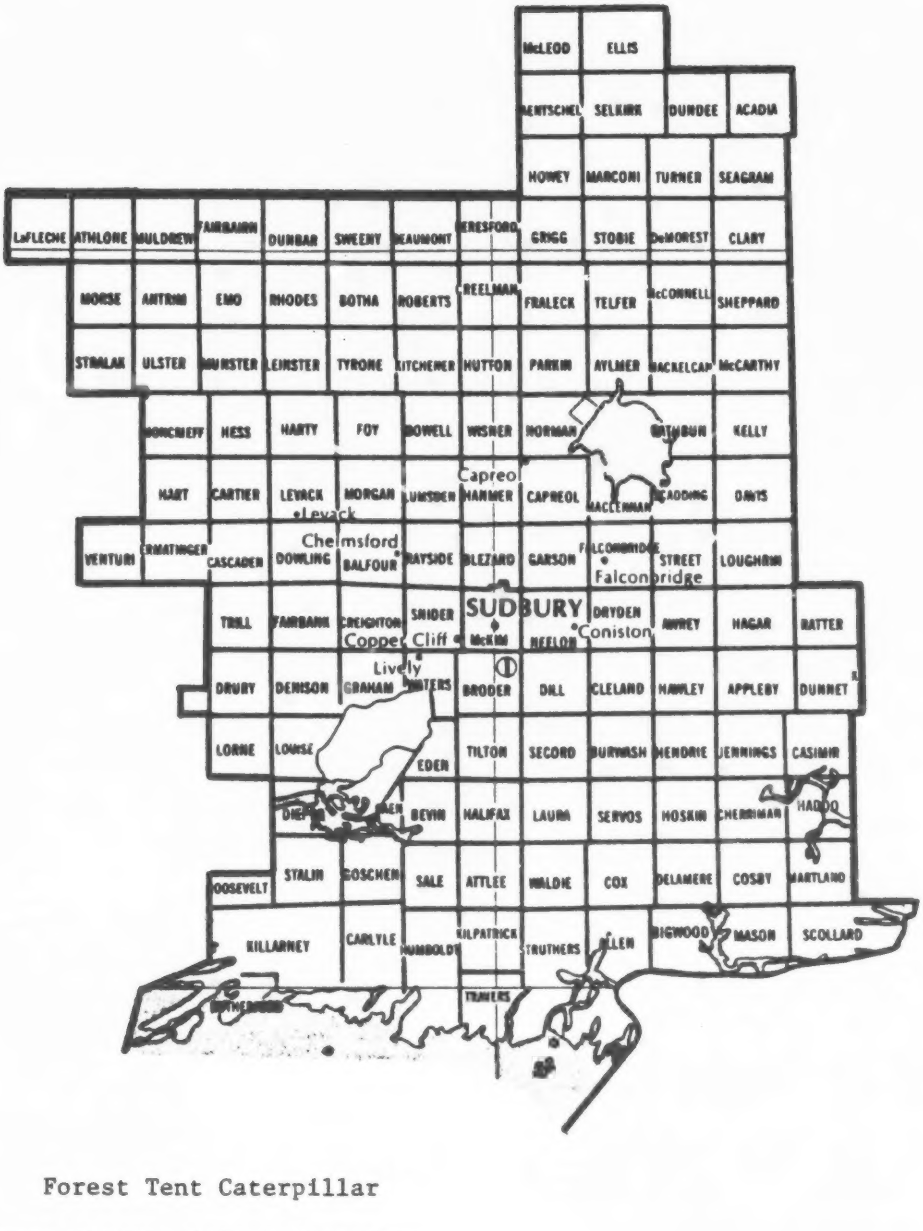
LEGEND

Light defoliation ⦶

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1969

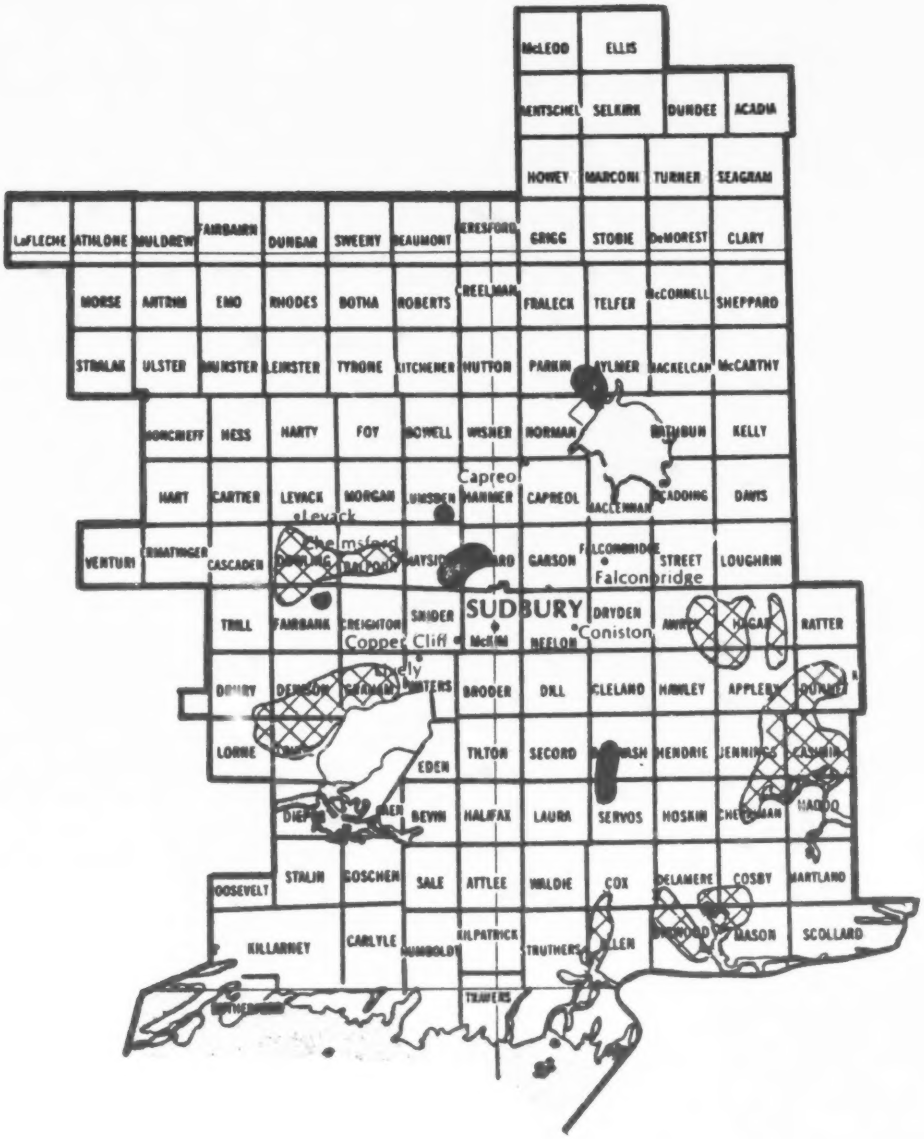
LEGEND

Light defoliation ①

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1973

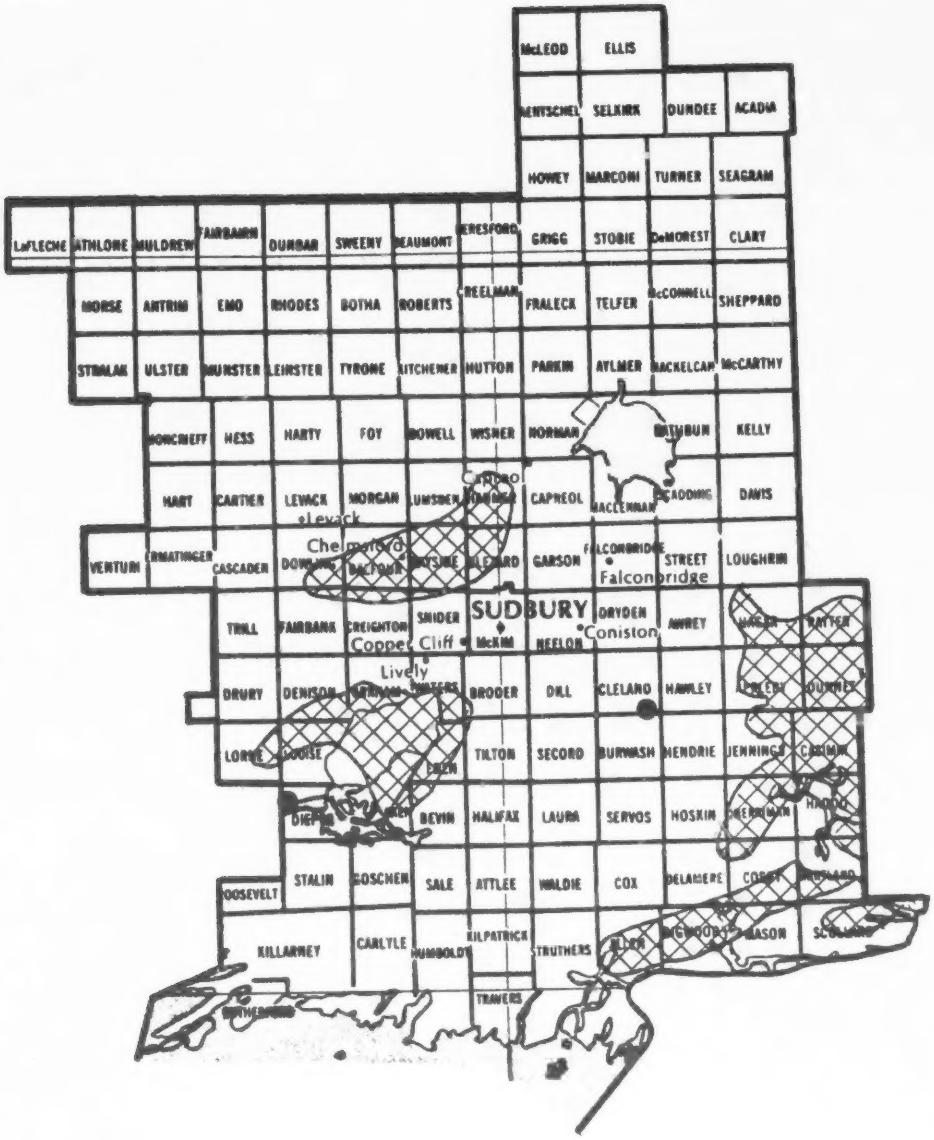
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1974

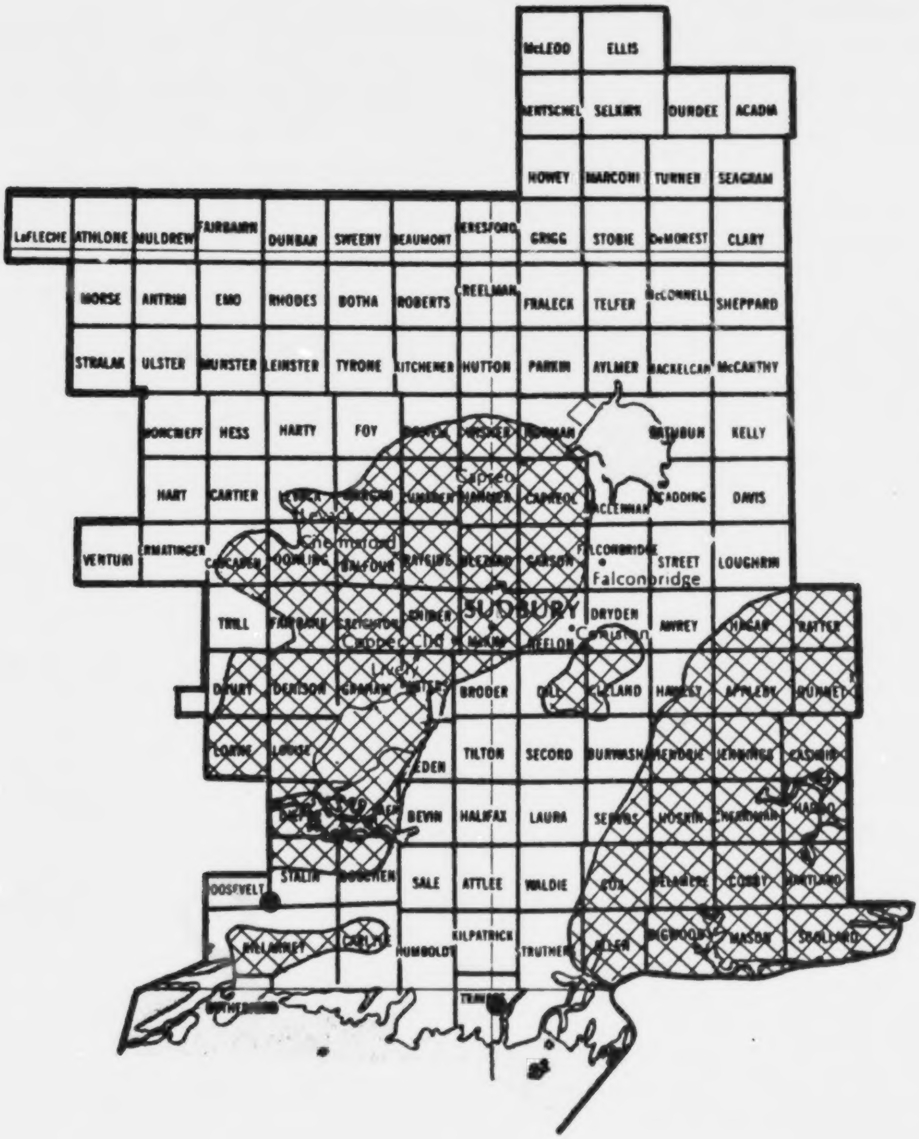
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

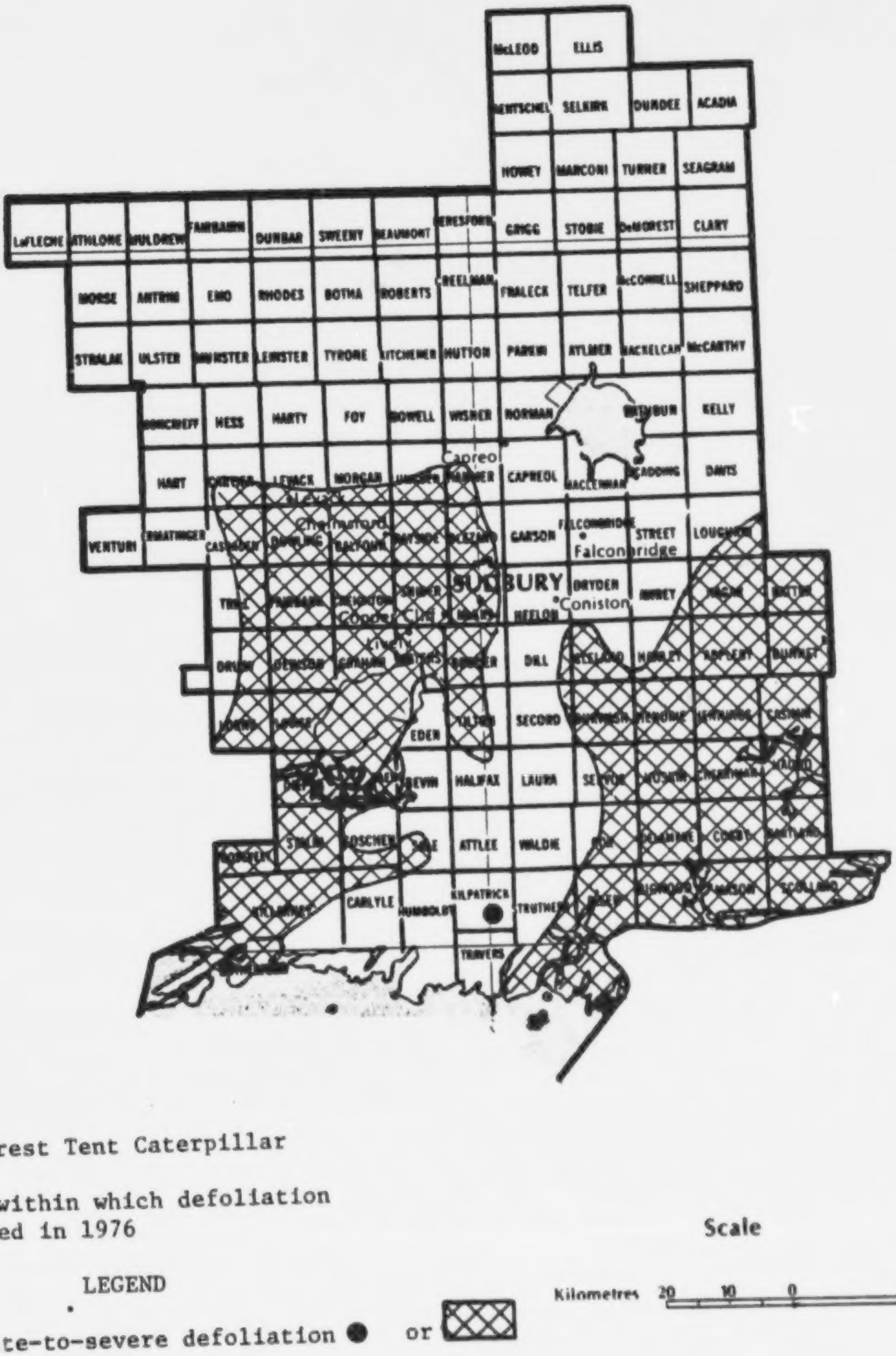
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

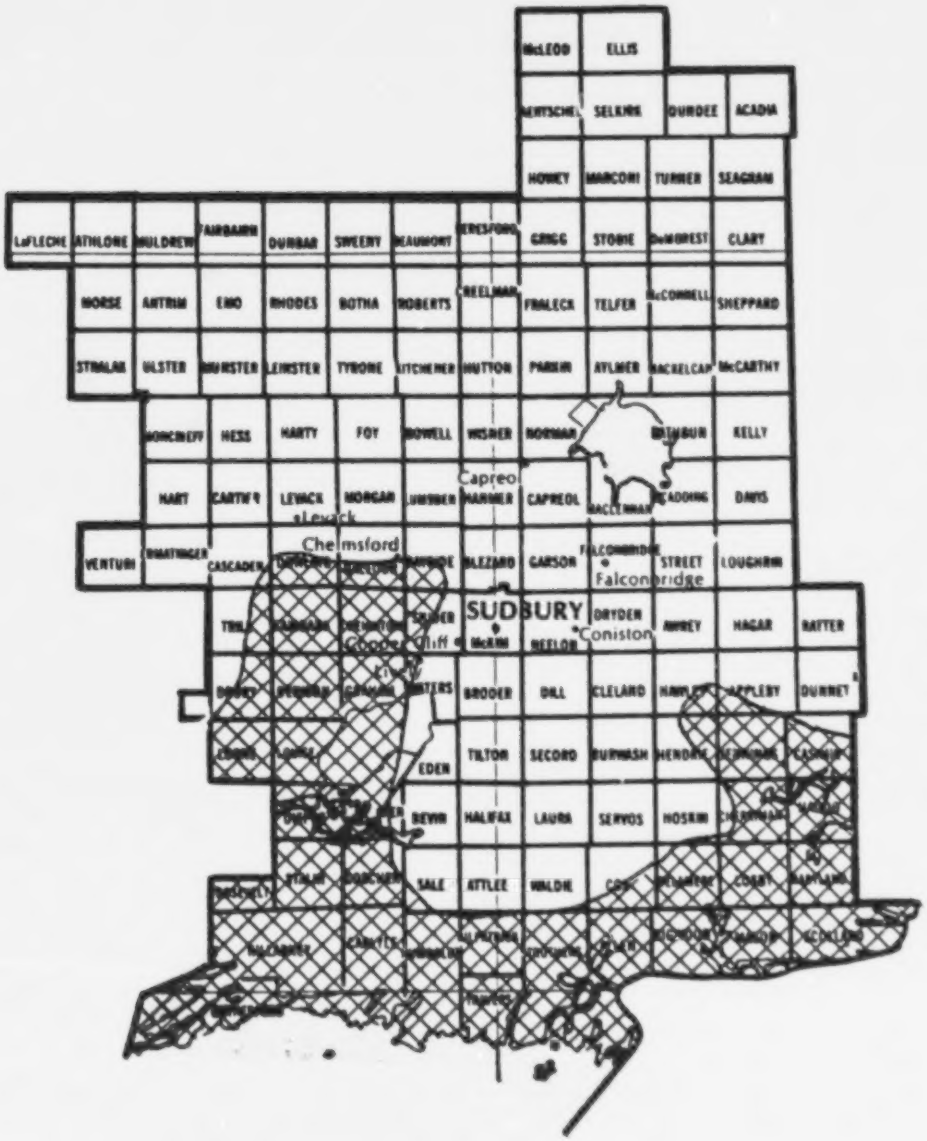
Scale

LEGEND

Kilometres 20 10 0 20

Moderate-to-severe defoliation ● or ▨

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

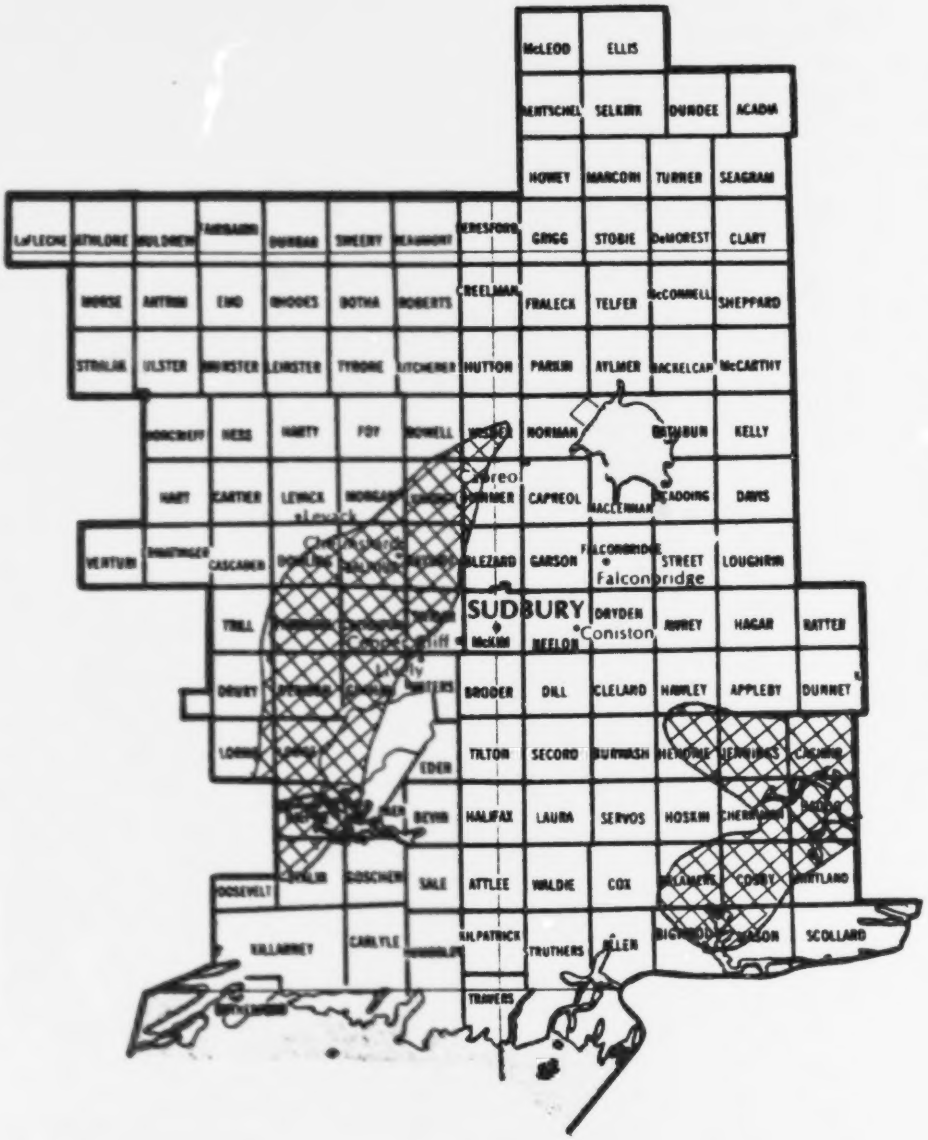
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

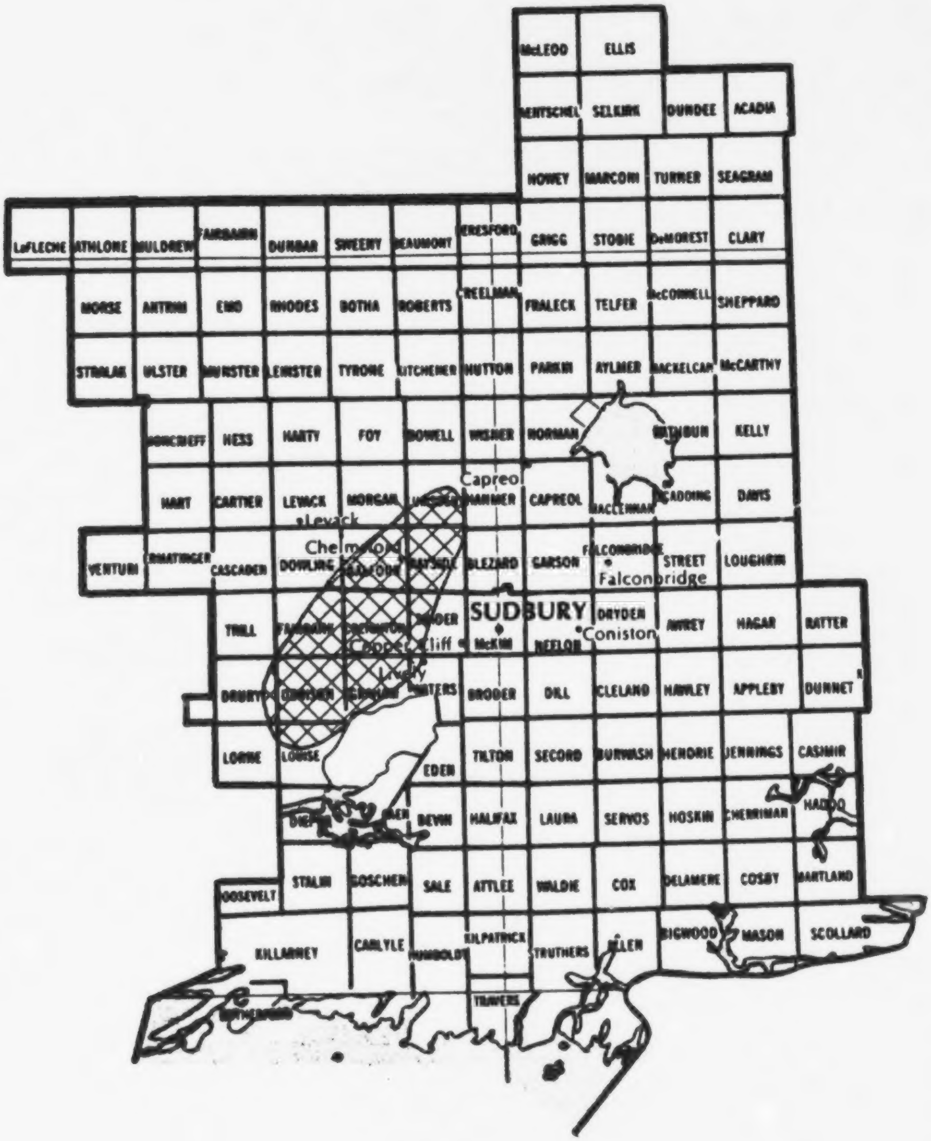
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation occurred in 1979

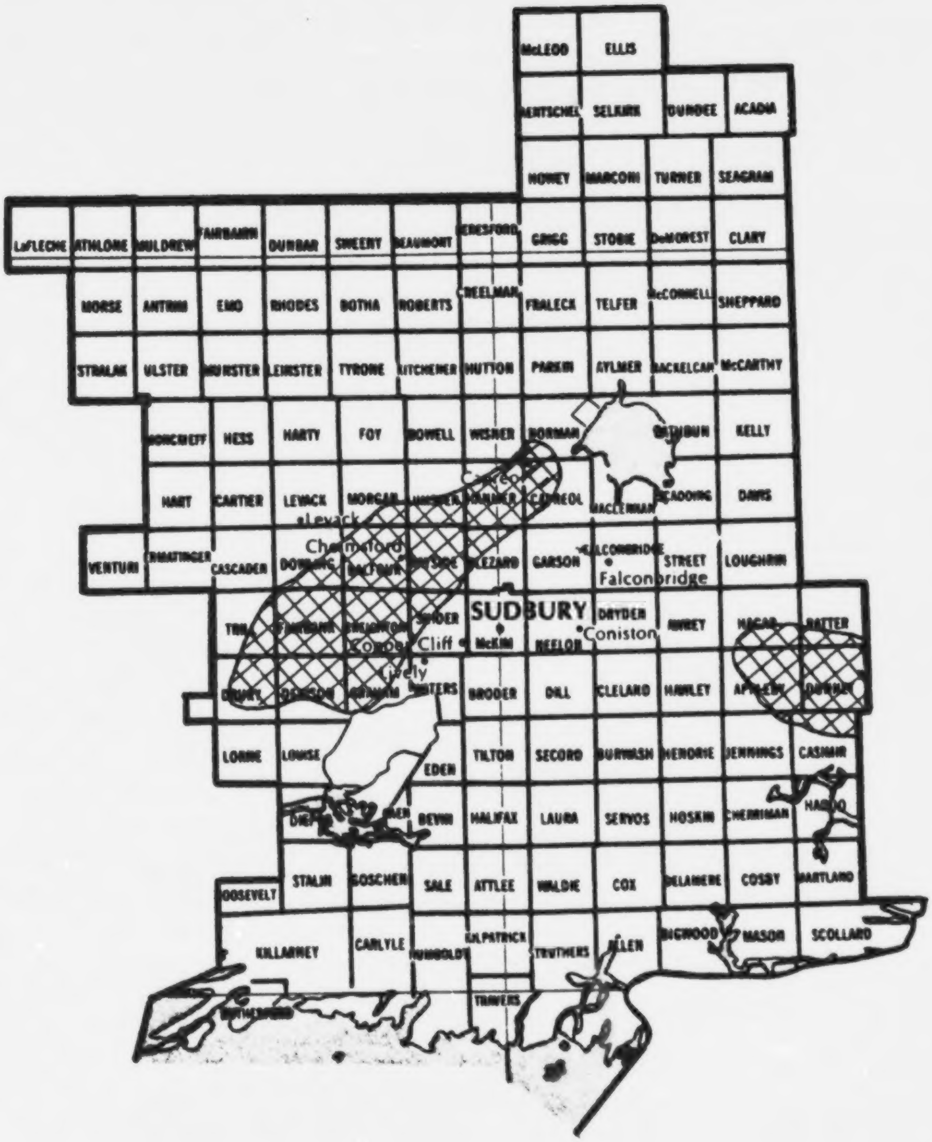
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Forest Tent Caterpillar

Areas within which defoliation
occurred in 1980

LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

Balsam Fir Sawfly, *Neodiprion abietis* complex

Host(s): bF, spruce [Major]

Year	Remarks
1950	not reported
1951	caused light defoliation in five townships
1952	One pocket of heavy damage occurred in Fairbank Twp.
1953	trace populations reported
1954-1957	not reported
1958-1961	scattered colonies observed in Cascaden Twp
1962	not reported
1963	trace population observed in Cascaden Twp
1964-1965	not reported
1966	single colony found in Moncrieff Twp
1967-1980	not reported

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Host(s): pine [Major]

Year	Remarks
1950-1953	not reported
1954	single colonies observed at widely scattered locations
1955	One small pocket of moderate-to-severe defoliation occurred in the Burwash Industrial Farm plantation. Control measures by Industrial Farm personnel kept the damage to a minimum.

(cont'd)

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) (concl.)

Year	Remarks
1956	Populations declined and defoliation was light at the Burwash Industrial Farm. Light defoliation was also observed in Hagar Twp.
1957	Light defoliation continued at Burwash Industrial Farm and at several points along Hwy 69. Considerable host tree mortality had occurred at this site since the 1955 infestation.
1958	light infestations reported at several points along Hwy 69
1959	trace populations observed in Mason and Aylmer twps
1960	trace populations found in Aylmer Twp
1961-1966	not reported
1967	Moderate-to-severe defoliation occurred at the Burwash Industrial Farm, with upwards of six colonies per tree.
1968	Populations decined at the Burwash Industrial Farm, with an average of 1.5 colonies per tree.
1969	Low populations continued, with an average of 1.1 colonies per tree.
1970-1971	low populations reported
1972-1980	not reported

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd.

Host(s): jP [Major]

Year	Remarks
1950-1953	not reported

(cont'd)

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd. (cont'd)

Host(s): jP [Major]

Year	Remarks
1954	Light defoliation occurred in Stralak, Moncrieff and Morgan twps.
1955	not reported
1956	single colonies found in Jennings, Hutton and Lumsden twps
1957	Light infestations occurred in jack pine stands in five townships northwest of Levack and on fringe trees at Selkirk Lake. Scattered larval colonies occurred north and east of Lake Wanapitei.
1958	Light infestations occurred at widely scattered points in the district. Larval colony counts were taken on 10 trees in Cartier Twp; an average of 2.0 colonies per tree were counted.
1959	There was a general increase in populations in the northern part of the district. Although infestations were generally light, moderate-to-severe defoliation of open-grown trees occurred along lakeshores and on islands at several points in the Onaping Lake area.
1960	A marked decline in populations occurred. This trend was most evident at Onaping Lake where moderate-to-severe defoliation of lakeshore trees had declined to light intensity. Occasional colonies were found in Burwash Twp.
1961	Populations in the Onaping Lake area declined to single or scattered colonies at a few points on lakeshore trees.
1962	populations low throughout the district
1963-1964	A light infestation occurred on a small island at Onaping Lake; the insect was not found elsewhere in the district.
1965	an average of six colonies per tree on a small island in Onaping Lake

(cont'd)

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd. (concl.)

Year	Remarks
1966	Populations on a small island in Onaping Lake increased to heavy intensity and spread to scattered trees along shorelines of the mainland.
1967	not reported
1968	Medium-to-heavy infestations were reported in the Onaping Lake area. Most of the larger trees in the Onaping infestation had been killed by repeated defoliation. Light infestations were observed in Morgan and Jennings twps.
1969	Low populations in the Onaping Lake area were due to host tree mortality. Low populations were found in Cherriman and Bigwood twps. An average of 2.9 larval colonies per tree were reported in these townships.
1970	Low populations occurred only in Bigwood, Munster and Ulster twps.
1971	reported at five widely scattered locations in the district
1972	not reported
1973	light defoliation on scattered trees at one location in Bigwood Twp
1974-1980	not reported

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh., *Neodiprion nanulus nanulus* Schedl., *Neodiprion virginianus* complex

Host(s): jP, rP [Major]

Year	Remarks
1950-1952	not reported

(cont'd)

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh., *Neodiprion nanulus nanulus* Schedl., *Neodiprion virginianus* complex (cont'd)

Year		Remarks
1953	*N. nanulus nanulus*	A light infestation occurred in Casden and Hart twps.
1954	*N. nanulus nanulus*	found in low numbers at widely scattered points
	N. virginianus	found in low numbers at widely scattered points
1955		not reported
1956	*N. virginianus*	scattered colonies found in Hutton and Cherriman twps
1957	*N. pratti banksianae*	occasional colonies found in Burwash and Hanmer twps
	N. virginianus	Light infestations occurred on open-grown jack pine trees in Foy and Burwash twps.
1958	*N. pratti banksianae*	light defoliation in Hanmer Twp and scattered colonies observed in the Lake Wanapitei area
	N. virginianus	light defoliation at widely scattered points in the district
1959	*N. pratti banksianae*	light defoliation in Rathbun and Hanmer twps and scattered colonies observed in Foy Twp
	N. nanulus nanulus	light damage reported in Hanmer Twp
	N. virginianus	trace levels found at widely scattered points
1960	*N. pratti banksianae*	Light infestations continued in Rathbun and Hanmer twps.
	N. nanulus nanulus	light damage reported at numerous locations in the district
	N. virginianus	trace levels found at widely scattered points

(cont'd)

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh., *Neodiprion nanulus nanulus* Schedl., *Neodiprion virginianus* complex (cont'd)

Year		Remarks
1961	*N. pratti banksianae*	medium-to-heavy infestations reported in Hanmer Twp and moderate-to-severe defoliation in the Lake Wanapitei area
	N. nanulus nanulus	light defoliation observed at numerous locations
	N. virginianus	low populations found at widely scattered points
1962	*N. nanulus nanulus*	pockets of light defoliation found in Rathbun and Hanmer twps
	N. pratti banksianae	moderate-to-severe defoliation in a 16-ha pole-sized stand of jack pine; 75% defoliation in Hanmer Twp
1963	*N. pratti banksianae*	moderate-to-severe defoliation persisted in a 16-ha stand of jack pine in Hanmer Twp. An area of light infestation was also observed in Cascaden Twp.
	N. nanulus nanulus	Low populations continued in Rathbun and Hanmer twps.
	N. virginianus	trace populations observed
1964	*N. pratti banksianae*	Populations declined to light intensity in a 16-ha jack pine stand in Hanmer Twp. Pockets of moderate-to-severe defoliation occurred in open-grown trees along Onaping Lake and the north end of Lake Wanapitei.
	N. nanulus nanulus	light defoliation at widely scattered locations in the district
	N. virginianus	Trace populations continued in the district.
1965	*N. pratti banksianae*	Pockets of moderate-to-severe defoliation continued on shoreline trees along Lake Wanapitei and Onaping Lake.

(cont'd)

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh., *Neodiprion nanulus nanulus* Schedl., *Neodiprion virginianus* complex (concl.)

Year		Remarks
1965	*N. nanulus nanulus*	light defoliation on scattered red pine northeast of Lake Wanapitei in Norman and Parkin twps
	N. virginianus	trace populations observed at widely scattered points
1966	*N. pratti banksianae*	Moderate-to-severe defoliation continued on shoreline trees along Lake Wanapitei and Onaping Lake.
	N. nanulus nanulus	light defoliation observed on individual red pine trees in Burwash Twp
	N. virginianus	Trace populations continued.
1967		not reported
1968-1969	*N. pratti banksianae*	low populations
	N. nanulus nanulus	low populations
	N. virginianus	Trace populations persisted at widely scattered points.
1970	*N. pratti banksianae*	small numbers of colonies observed at two locations
	N. virginianus	trace populations
1971		not reported
1972	*N. pratti banksianae*	occasional colonies found in the Trout Lake area in Hoskin Twp
1973	*N. pratti banksianae*	occasional colonies observed in Balfour Twp
1974-1980		not reported

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.)

[Major]

Host(s): aspen

Year	Remarks
1950	not reported
1951	moderate-to-severe leaf mining throughout the northern part of the district
1952-1953	moderate-to-severe leaf mining throughout the entire district
1954	moderate-to-severe leaf mining in Drury Twp
1955-1957	not reported
1958	low populations reported
1959	not reported
1960	light leaf mining on regeneration
1961	moderate-to-severe leaf mining of understory trees in the Onaping Lake area
1962-1963	moderate-to-severe leaf mining occurred in the northwestern part of the district.
1964	High populations continued in the northwestern part of the district. Small numbers of mined leaves were observed at scattered points in the southern part.
1965	Populations declined to light levels at widely scattered points in the district.
1966	light populations observed at widely scattered points
1967	trace populations observed
1968-1971	not reported
1972	light leaf mining observed in Cascaden Twp
1973-1976	not reported
1977	light damage observed on regeneration in Antrim Twp
1978-1980	not reported

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Host(s): spruce [Major]

Year	Remarks
1950	Moderate-to-severe defoliation occurred on black spruce in the Venetian Lake area.
1951	moderate-to-severe defoliation on single open-grown spruce trees in Ulster and Dill twps
1952	moderate-to-severe defoliation on open-grown trees in Norman Twp
1953	moderate-to-severe defoliation on open-grown trees in Moncrieff Twp
1954	moderate-to-severe defoliation on open-grown trees in Cascaden and Norman twps
1955-1956	not reported
1957-1960	Moderate-to-severe defoliation of small, open-grown white spruce trees occurred in Burwash Twp and low numbers were found at widely scattered points.
1961	trace populations at widely scattered locations
1962-1963	not reported
1964	trace populations observed in the district
1965-1967	moderate-to-severe damage on small, scattered white spruce trees in Burwash Twp
1968-1975	not reported
1976	moderate-to-severe defoliation in a small white spruce plantation managed by the Nickel District Conservation Authority in Neelon Twp and on individual trees in Lorne Twp
1977	Moderate-to-severe defoliation persisted in Neelon Twp, and high numbers were reported on small planted trees in Denison and Lorne twps.
1978	caused some tree mortality and top-kill in Neelon Twp

(cont'd)

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) (concl.)

Year	Remarks
1979	Low populations were noted in a white spruce plantation in Burwash Township, where the rate of trees attacked rose from endemic levels in 1978 to 24% in 1979.
1980	Light damage occurred in many locations in the district.

White Pine Weevil, *Pissodes strobi* (Peck)

Host(s): pine, spruce [Major]

Year	Remarks
1950-1951	not reported
1952	trace levels observed in Cartier and Delamere twps
1953-1956	trace levels observed at widely scattered locations
1957	Light leader damage occurred on white pine in Hendrie Twp.
1958-1960	low populations reported at widely scattered points
1961	Counts did not exceed 2% in the district.
1962	trace levels reported
1963-1967	not reported
1968-1969	light leader damage observed at widely scattered points
1970	averaged 6% leader damage in four townships
1971	The number of weeviled trees increased in the district. At six sample plots, leader damage averaged 12%.
1972	Populations increased. Leader damage was 17% in six white pine plantations and 2% in jack pine plantations.

(cont'd)

White Pine Weevil, *Pissodes strobi* (Peck) (concl.)

Year	Remarks
1973	A slight decline was reported. Average leader damage was 12.4%.
1974	not reported
1975	averaged 22% leader damage in Delamere Twp
1976	Leader damage increased from 22% to 27% in Delamere Twp
1977	A decline was noted in the district. An average of 13.5% of leaders were damaged in Delamere and Burwash twps.
1978	caused 30% leader damage in Burwash Twp
1979	Leader damage in Burwash Twp reached 41%.
1980	Heavy damage was reported in Burwash and Delamere twps. Leader damage averaged 58%.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Host(s): tL [Major]

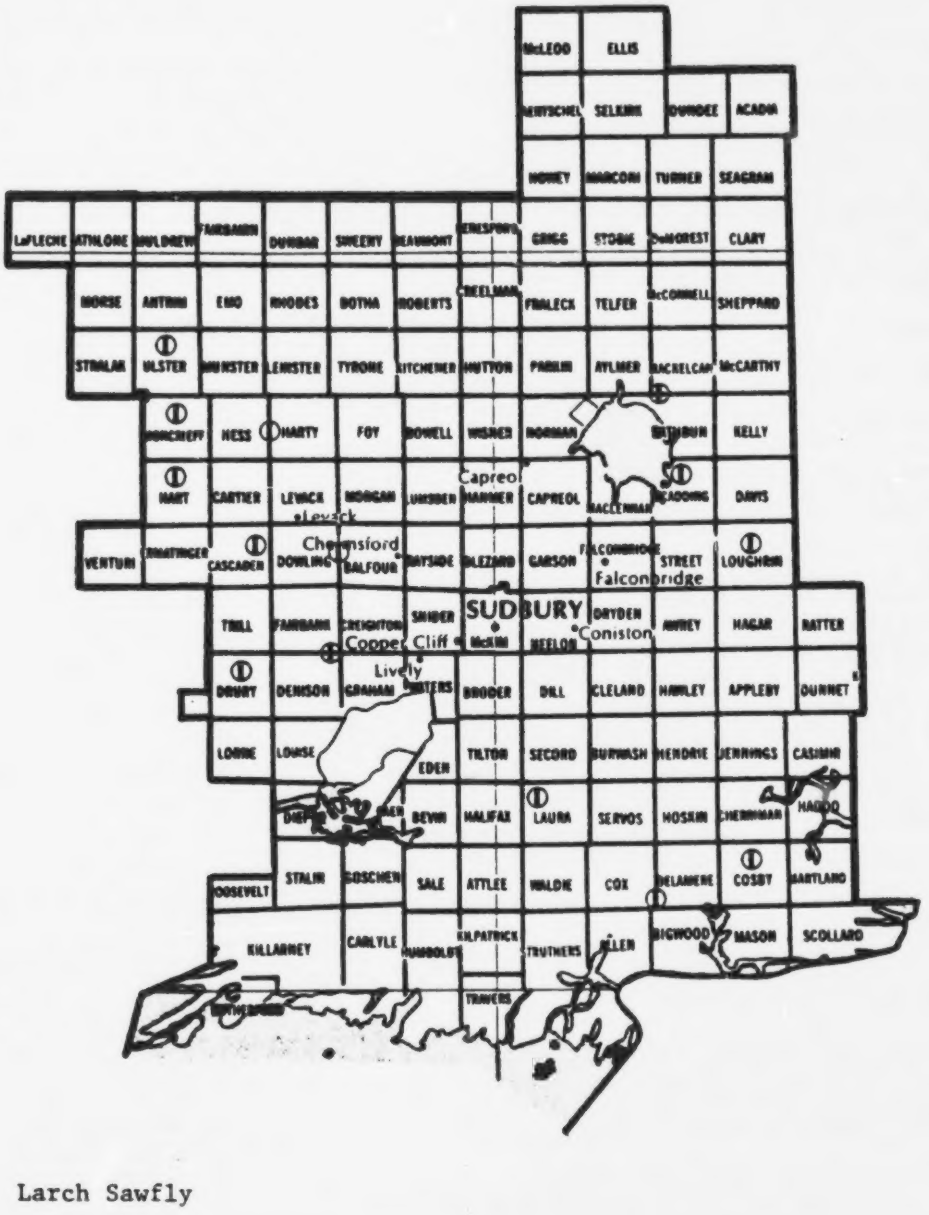
Year	Remarks
1950-1953	not reported
1954	light infestations reported at widely scattered locations (see map, page 106)
1955	Populations increased and defoliation was light at widely scattered locations (see map, page 107).
1956	comparable to 1955 populations (see map, page 108)
1957	Populations were light; however, several pockets of moderate and severe defoliation were reported (see map, page 109).
1958	Populations increased slightly (see map, page 110).

(cont'd)

Larch Sawfly, *Pristiphora erichsonii* (Htg.) (concl.)

Year	Remarks
1959	Populations were generally light; however, several pockets of severe defoliation were recorded (see map, page 111).
1960	Populations declined (see map, page 112).
1961	Medium-to-heavy infestations were reported in Trill and Moncrieff twps and light infestations at several locations (see map, page 113).
1962-1964	low populations reported
1965	light defoliation reported at widely scattered locations
1966	Low populations were reported; these were confined to small, open-grown trees.
1967-1968	not reported
1969	moderate-to-severe defoliation reported in Dill Twp
1970	moderate-to-severe defoliation reported in Lorne Twp
1971	medium-to-heavy infestations reported in four townships
1972	not reported
1973-1974	endemic populations reported
1975-1980	not reported

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliation occurred in 1954

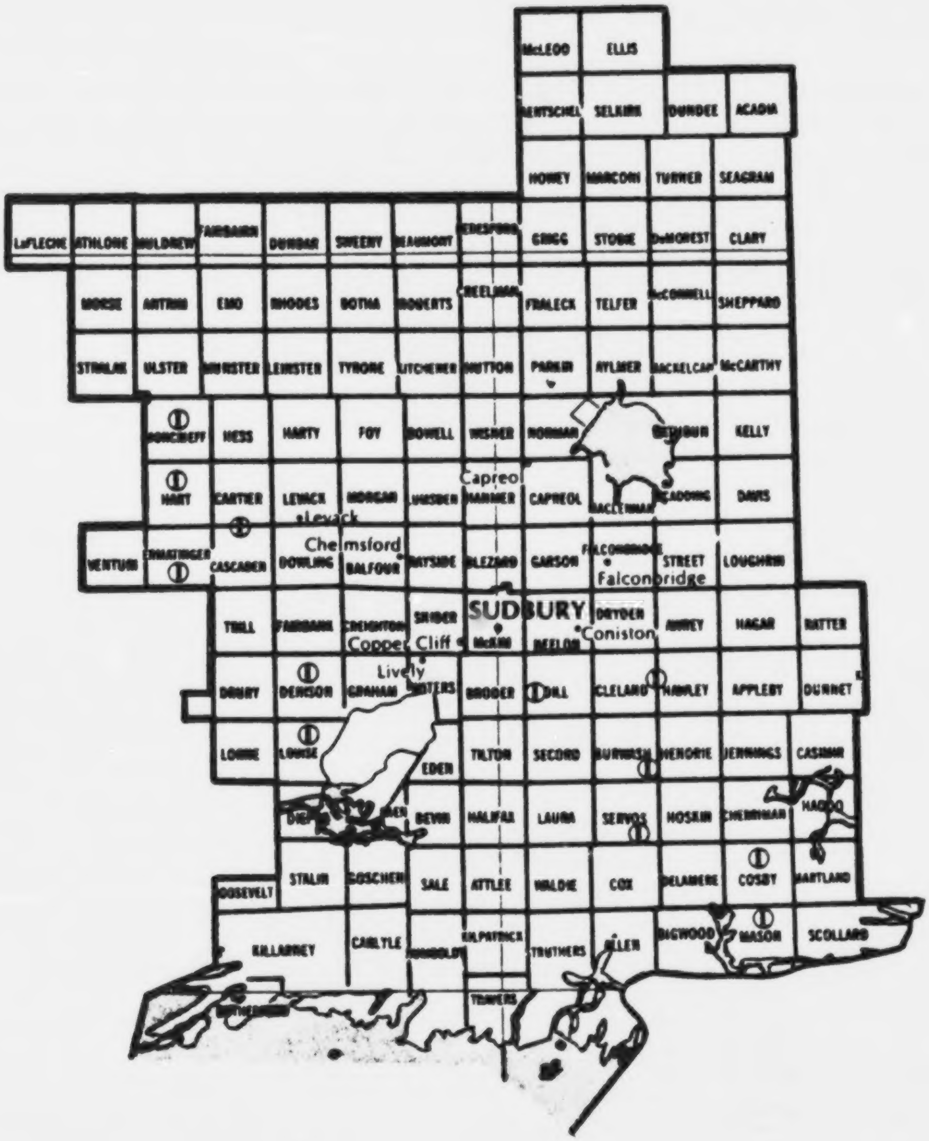
LEGEND

Light defoliation ⦶

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliation occurred in 1955

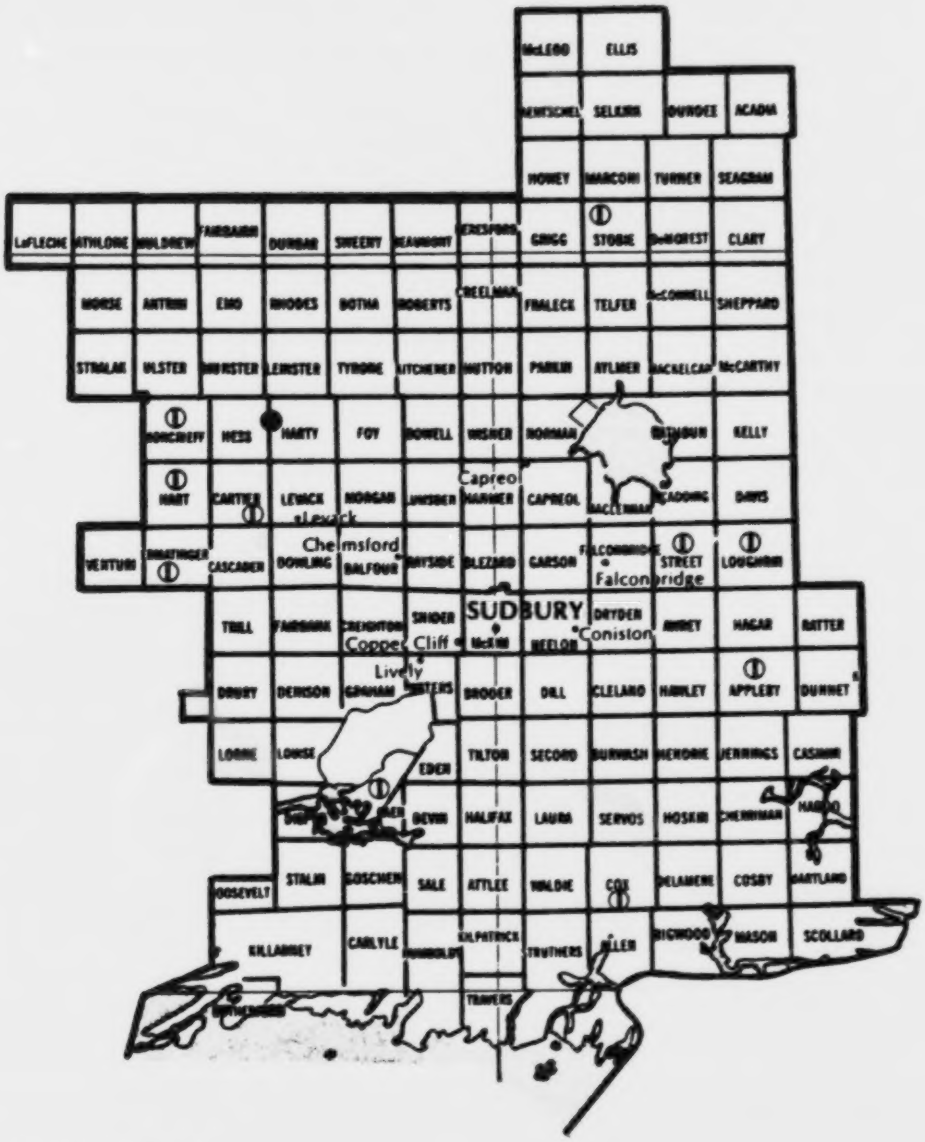
LEGEND

Light defoliation ⦶

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliaton occurred in 1956

LEGEND

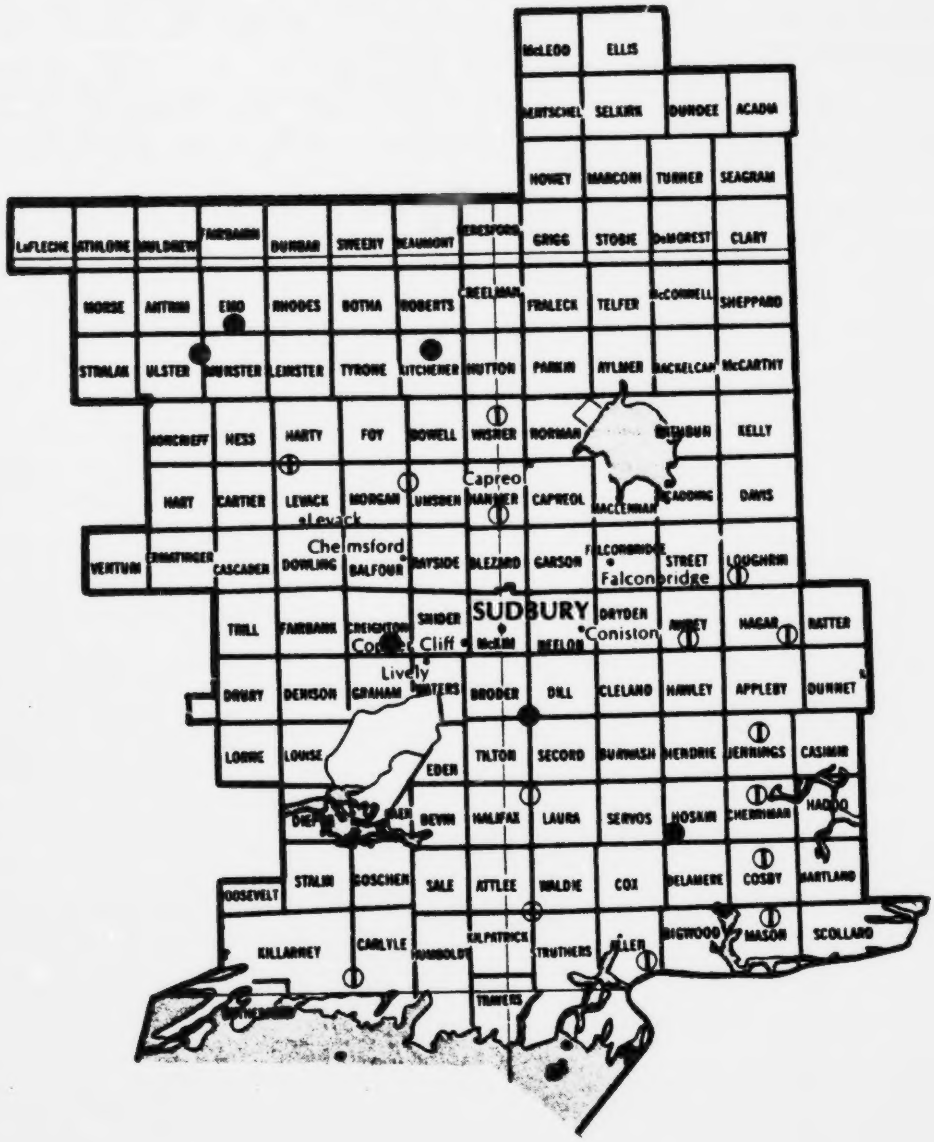
Light defoliation ⦶

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliation occurred in 1957

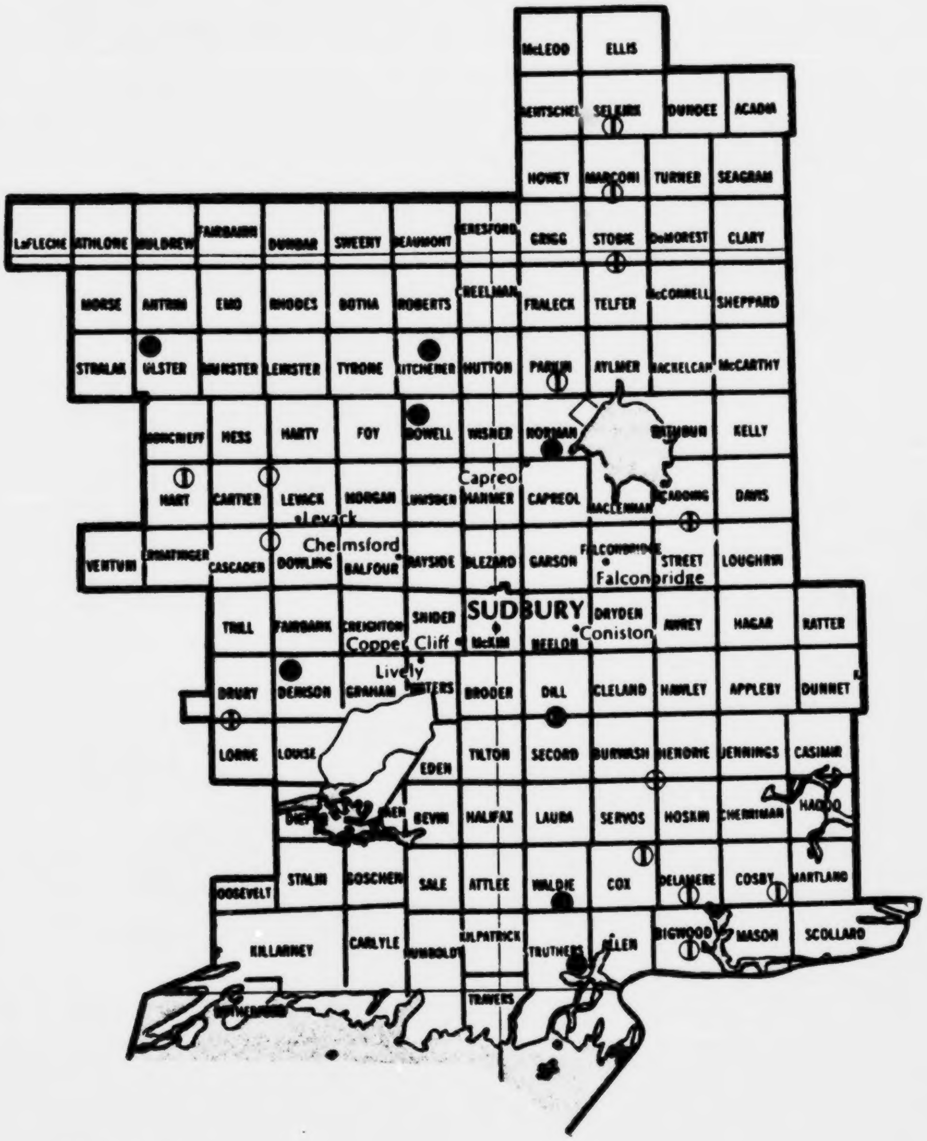
LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

Scale

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliation occurred in 1958

LEGEND

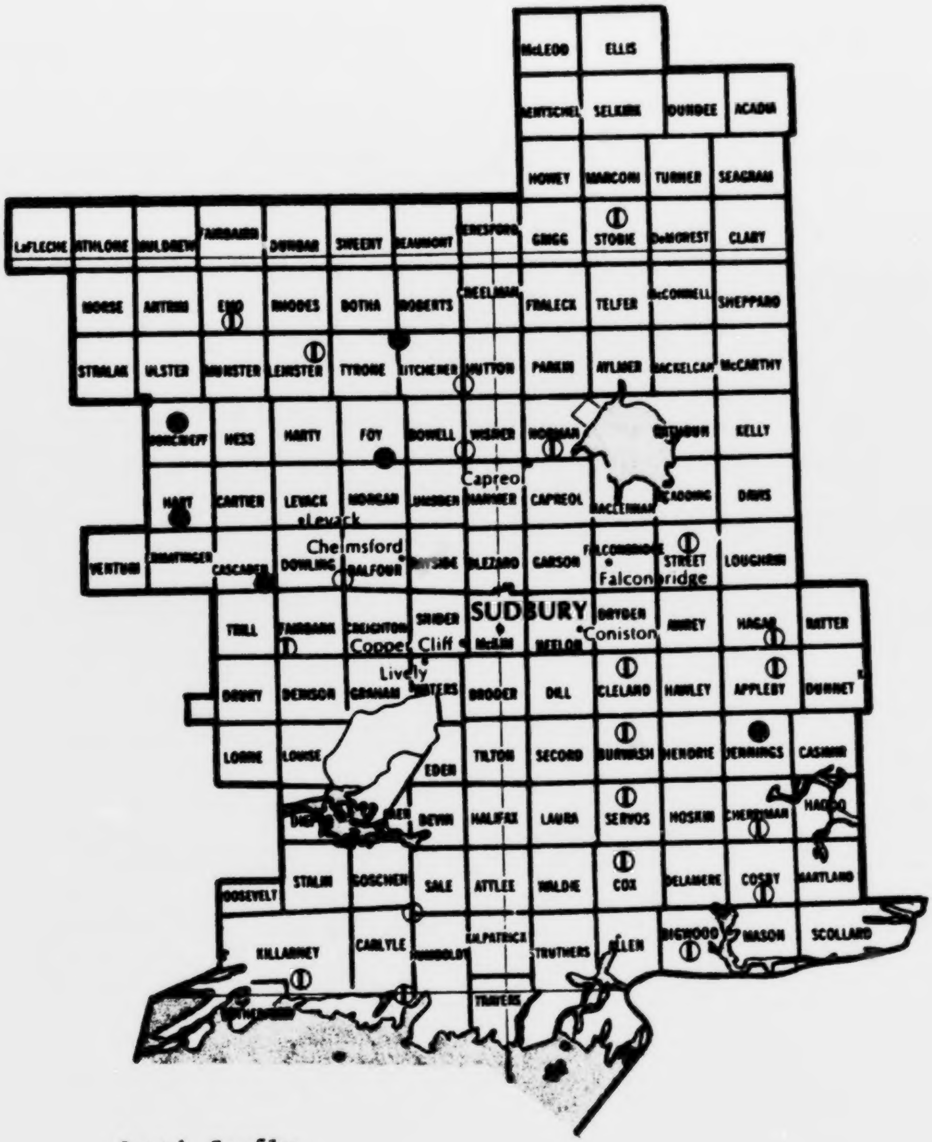
Light defoliation ⦶

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliation occurred in 1959

LEGEND

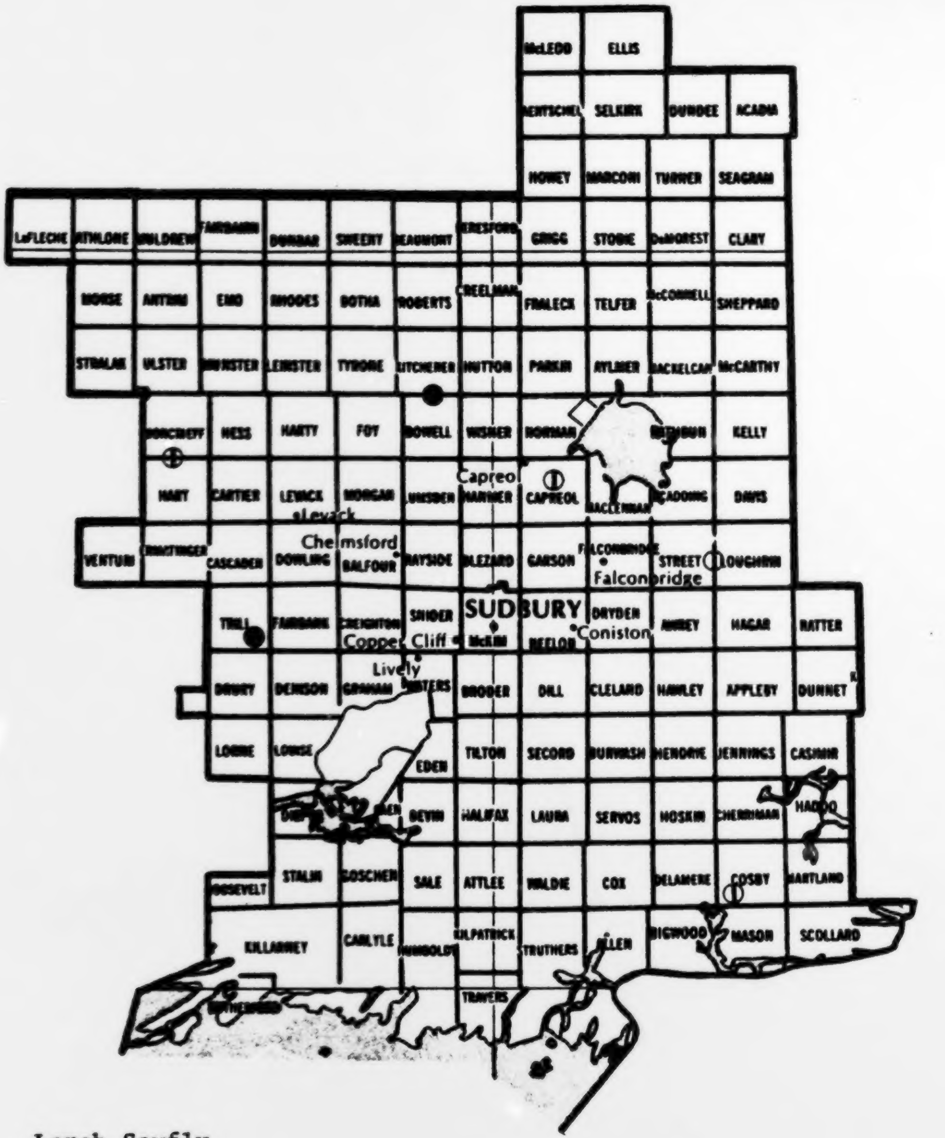
Light defoliation ◐

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliation occurred in 1960

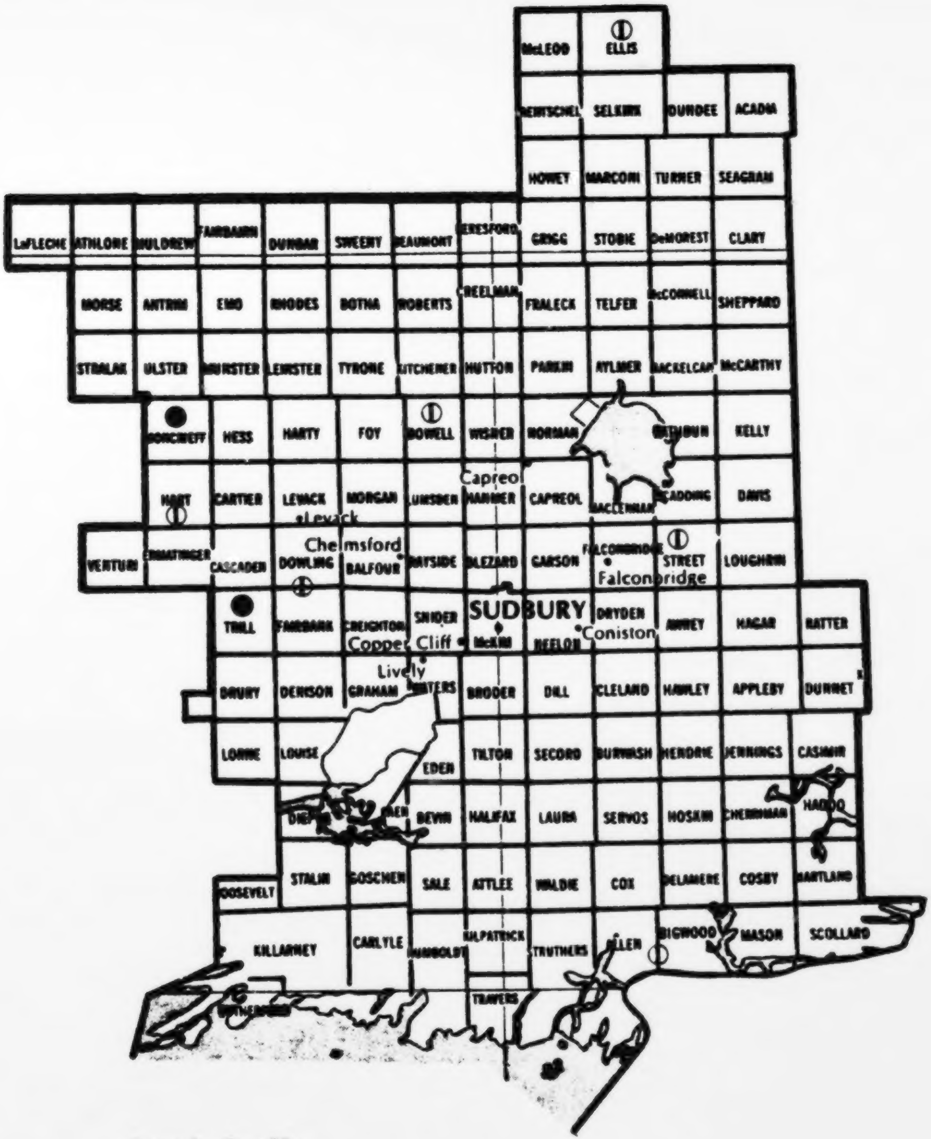
LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

Scale

SUDBURY DISTRICT



Larch Sawfly

Areas within which defoliation occurred in 1961

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

Other Noteworthy Insects

Eastern Blackheaded Budworm, *Acleris variana* (Fern.)

Host(s): spruce, bF [Major]

Year	Remarks
1950-1952	not reported
1953	low populations recorded in six townships
1954-1958	not reported
1959-1960	small numbers at scattered points
1961-1962	light defoliation observed in Mongowin Twp
1963	low populations observed at widely scattered points
1964-1966	not reported
1967	low populations observed at a few locations
1968-1980	not reported

Uglynest Caterpillar, *Archips cerasivorana* (Fitch)

Host(s): cherry [Major]

Year	Remarks
1950-1956	not reported
1957	Pockets of medium-to-heavy infestation occurred at scattered points.
1958	medium-to-heavy infestations observed in the southern and central parts of the district
1959	Medium-to-heavy infestations occurred in the southern part of the district.
1960-1967	not reported

(cont'd)

Uglynest Caterpillar, *Archips cerasivorana* (Fitch) (concl.)

Year	Remarks
1968	pockets of medium-to-heavy infestation observed in Bigwood Twp
1969-1970	not reported
1971	High populations were recorded in the Blezard Valley area.
1972-1980	not reported

Birch Sawfly, *Arge pectoralis* (Leach)

Host(s): birch [Major]

Year	Remarks
1950	light defoliation observed in four townships
1951	small numbers collected in three townships
1952-1953	not reported
1954	Light defoliation occurred in four townships.
1955	not reported
1956	populations at a low ebb
1957-1980	not reported

Jack Pine Resin Midge, *Cecidomyia resinicola* (O.S.)

Host(s): jP [Minor]

Year	Remarks
1950-1973	not reported

(cont'd)

Jack Pine Resin Midge, *Cecidomyia resinicola* (O.S.) (concl.)

Year	Remarks
1974	Light shoot mortality occurred at Windy Lake Provincial Park.
1975-1980	not reported

Poplar Leaf Beetle, *Chrysomela walshi* Brown

Host(s): bPo [Minor]

Year	Remarks
1950-1978	not reported
1979	low populations widely distributed
1980	not reported

Jack Pine Tip Beetle, *Conophthorus banksianae* McPherson

Host(s): jP [Major]

Year	Remarks
1950-1979	not reported
1980	Low populations were observed at widely scattered locations.

Red Pine Cone Beetle, *Conophthorus resinosae* Hopk.

Host(s): rP [Minor]

Year	Remarks
1950-1956	not reported

(cont'd)

Red Pine Cone Beetle, *Conophthorus resinosae* Hopk. (concl.)

Year	Remarks
1957	cones heavily infested in Allen Twp
1958-1980	not reported

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Host(s): oak [Major]

Year	Remarks
1950-1960	not reported
1961	Small pockets of medium-to-heavy infestation occurred in Cox Twp.
1962-1966	not reported
1967	Pockets of moderate-to-severe defoliation were observed in Moncrieff Twp.
1968-1980	not reported

Yellownecked Caterpillar, *Datana ministra* (Dru.)

Host(s): deciduous [Minor]

Year	Remarks
1950-1953	not reported
1954	Light defoliation occurred in McKim Twp.
1955-1980	not reported

Aspen Twoleaf Tier, *Enargia decolor* (Wlk.)

Host(s): aspen [Major]

Year	Remarks
1950-1959	not reported
1960	Moderate-to-severe defoliation was evident in Trill and Cascaden twps.
1961-1962	not reported
1963	Small pockets of heavy infestation occurred in Aylmer Twp.
1964-1969	not reported
1970	moderate-to-severe defoliation observed at several locations
1971	Approximately 20% defoliation occurred in the Trout Lake area.
1972	Populations declined to a low ebb.
1973-1980	not reported

Birch-aspen Leafroller, *Epinotia solandriana* Linn.

Host(s): birch aspen [Major]

Year	Remarks
1950-1964	not reported
1965	moderate-to-severe defoliation observed at scattered points
1966	Pockets of moderate-to-severe defoliation occurred in Balfour Twp.
1967-1980	not reported

European Alder Leafminer, *Fenusa dohrnii* (Tischb.)

Host(s): alder [Major]

Year	Remarks
1950-1957	not reported
1958	moderate-to-severe defoliation oberved in Aylmer Twp
1959-1980	not reported

European Spruce Sawfly, *Gilpinia hercyniae* (Htg.)

Host(s): spruce [Minor]

Year	Remarks
1950-1951	small numbers collected
1952-1953	not reported
1954	pockets of light infestation observed in four townships
1955-1966	not reported
1957	only small numbers found
1958	Light defoliation occurred in a plantation in Burwash Twp.
1959	Populations were at a low ebb.
1960	commonly observed in the southern part of the district
1961-1963	not reported
1964-1966	larvae common in samples taken in Bigwood Twp
1967	low populations observed at scattered points
1968	not reported

(cont'd)

European Spruce Sawfly, *Gilpinia hercyniae* (Htg.) (concl.)

Year	Remarks
1969	only low populations observed
1970-1980	not reported

American Aspen Beetle, *Gonioctena americana* (Schaef.)

Host(s): aspen [Major]

Year	Remarks
1950-1972	not reported
1973	light defoliation widespread throughout the district
1974	Moderate-to-severe defoliation occurred in Dowling and Moncrieff twps.
1975	moderate-to-severe defoliation observed in Antrim Twp
1976	not reported
1977	Light defoliation occurred in Antrim and Fraleck twps.
1978	Populations decreased to a low ebb.
1979-1980	not reported

Fall Webworm, *Hyphantria cunea* Dru.

Host(s): deciduous [Major]

Year	Remarks
1950	low populations observed at scattered locations
1951-1953	not reported
1954	small numbers observed at a few points

(cont'd)

Fall Webworm, *Hyphantria cunea* Dru. (concl.)

Year	Remarks
1955	Light defoliation occurred in Fairbairn Twp.
1956-1957	High populations were recorded at scattered locations.
1958	Populations declined to a low ebb.
1959	small numbers observed at scattered locations
1960-1967	not reported
1968	Low populations were observed at a few points.
1969-1980	not reported

Eastern Tent Caterpillar, *Malacosoma americanum* F.

Host(s): cherry, apple, plum [Major]

Year	Remarks
1950	Light defoliation occurred at several points in the southern part of the district.
1951	not reported
1952-1953	Light defoliation was observed at widely separated locations.
1954-1957	Only small numbers could be found.
1958	not reported
1959-1960	Low populations were observed at scattered points.
1961	not reported
1962	Low populations were observed at many locations in the southern part of the district.

(cont'd)

Eastern Tent Caterpillar, *Malacosoma americanum* F. (concl.)

Year	Remarks
1963	Populations increased and caused light defoliation in the southern part of the district.
1964	High populations occurred in the southeastern part of the district.
1965	High populations were observed in Bigwood Twp.
1966	High populations were general throughout the district.
1967-1980	not reported

Northern Tent Caterpillar, *Malacosoma californicum pluviale* Dyar

Host(s): deciduous [Minor]

Year	Remarks
1950-1956	not reported
1957	numerous colonies observed in Telfer Twp
1958-1980	not reported

Balsam Twig Aphid, *Mindarus abietinus* Koch.

Host(s): bF [Minor]

Year	Remarks
1950-1954	not reported
1955	high numbers on open-grown trees at scattered locations
1956-1980	not reported

Arborvitae Sawfly, *Monoctenus juniperinus* MacG.

Host(s): cedar, juniper [Minor]

Year	Remarks
1950	not reported
1951	light defoliation observed at scattered points
1951-1980	not reported

Mourningcloak Butterfly, *Nymphalis antiopa* (L.)

Host(s): deciduous [Minor]

Year	Remarks
1950-1954	not reported
1955	small numbers observed at scattered points
1956-1958	not reported
1959	moderate-to-severe defoliation on scattered trees
1960-1962	not reported
1963	moderate-to-severe defoliation of scattered trees
1964-1970	not reported
1971	Moderate-to-severe defoliation occurred in the Ramsey Lake area.
1972-1980	not reported

Whitemarked Tussock Moth, *Orgyia leucostigma intermedia* Fitch

Host(s): coniferous, deciduous [Minor]

Year	**Remarks**
1950-1975	not reported
1976	common in the city of Sudbury
1977-1980	not reported

Northern Pitch Twig Moth, *Petrova albicapitana* (Busck.)

Host(s): jP [Minor]

Year	**Remarks**
1950-1953	not reported
1954	light branch mortality recorded in Capreol, Hutton and Blezard twps
1955-1956	not reported
1957	medium-to-heavy branch mortality observed in Maclennan Twp
1958-1960	not reported
1961-1962	Low populations were observed at scattered locations.
1963-1980	not reported

Redspruce Adelgid, *Pineus floccus* Patch

Host(s): spruce [Minor]

Year	**Remarks**
1950-1960	not reported
1961	Medium-to-heavy infestations were observed on scattered black spruce trees in Hanmer and Lumsden twps.
1962-1980	not reported

Balsam Shootboring Sawfly, *Pleroneura brunneicornis* Roh.

Host(s): bF [Minor]

Year	Remarks
1950-1958	not reported
1959	small numbers observed at scattered locations
1960	Moderate-to-severe current shoot mortality occurred on open-grown trees at numerous locations.
1961-1963	not reported
1964	moderate-to-severe current shoot mortality evident at numerous locations
1965-1980	not reported

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.)

Host(s): Mo [Major]

Year	Remarks
1950-1957	not reported
1958	moderate-to-severe defoliation observed at scattered points throughout the district
1959	Defoliation ranged from light to moderate to severe at scattered locations.
1960-1967	not reported
1968	small numbers observed in the northeastern part of the district
1969	not reported
1970	Moderate-to-severe defoliation occurred at several locations.

(cont'd)

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.) (concl.)

Year	Remarks
1971	not reported
1972	moderate-to-severe defoliation observed at scattered points
1973-1980	not reported

Ambermarked Birch Leafminer, *Profenusa thomsoni* (Konow)

Host(s): birch [Major]

Year	Remarks
1950-1956	not reported
1957	moderate-to-severe foliage mining evident on small trees in Morgan Twp
1958	Moderate-to-severe foliage mining occurred on regeneration birch in McKim Twp.
1959-1961	not reported
1962	low populations evident at scattered points
1963-1964	not reported
1965	Small numbers occurred at scattered points.
1966-1967	not reported
1968	Low populations occurred in the northern part of the district.
1969-1970	not reported
1971	small numbers observed at scattered points
1972-1980	not reported

Aspen Leafroller, *Pseudexentera oregonana* Wlshm.

Host(s): aspen [Major]

Year	Remarks
1950-1963	not reported
1964-1965	moderate-to-severe defoliation evident in the southern half of the district
1966-1978	not reported
1979	Low populations occurred in the city of Sudbury.
1980	small pockets of light defoliation observed in the Alban area

Oak Leaftier, *Psilocorsis quercicella* Clem.

Host(s): deciduous [Minor]

Year	Remarks
1950-1960	not reported
1961	medium-to-heavy infestations observed on scattered trees in Hoskin and Allen twps
1962-1970	not reported
1971	Defoliation reached approximately 20% in Carlyle Twp.
1972-1980	not reported

Aspen Webworm, *Tetralopha aplastella* (Hlst.)

Host(s): aspen, birch [Minor]

Year	Remarks
1950-1970	not reported

(cont'd)

Aspen Webworm, *Tetralopha aplastella* (Hlst.) (concl.)

Year	Remarks
1971	Defoliation ranged from 20% to 40% in Hanmer Twp.
1972-1980	not reported

Spruce Bud Moth, *Zeiraphera canadensis* Mut. & Free.

Host(s): spruce [Major]

Year	Remarks
1950-1959	not reported
1960	common on open-grown white spruce at several locations
1961	medium-to-heavy infestations observed in the southern part of the district
1962	not reported
1963	Moderate-to-severe current shoot defoliation was evident in Burwash Twp.
1964-1968	not reported
1969	Medium-to-heavy infestations occurred on scattered trees in Mason Twp.
1970-1977	not reported
1978	High populations occurred on scattered trees in Carlyle Twp.
1979-1980	not reported

DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.) Kumm.

Host(s): coniferous, deciduous [Major]

Year	Remarks
1950-1957	not reported
1958	light infections found at widely scattered locations
1959-1961	not reported
1962	Light tree mortality occurred in a Scots pine plantation at one point in the district.
1963	Single trees and small groups of trees were infected at numerous locations.
1964-1967	not reported
1968	Two pockets of moderate-to-severe infection occurred near Vermilion Lake in Fairbank Twp.
1969-1971	not reported
1972	caused 5% mortality in a red pine plantation in Street Twp
1973-1977	not reported
1978	low incidence in the district
1979-1980	trace levels common, particularly in immature stands

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau

Host(s): wE [Major]

Year	Remarks
1950-1965	not reported

(cont'd)

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau (concl.)

Year	Remarks
1966	The disease was discovered in Scollard Twp in the southeastern corner of the district. Incidence was low, with only one or two trees affected at each location.
1967	not reported
1968	high levels of infections reported in Struthers Twp
1969	4% level of infection in the Blezzard Valley area; tree mortality reported along the Veuve River in Hagar Twp
1970	25% of the elm trees in all age classes infected along LaCloche Creek
1971	widespread in the southern portion of the district
1972	The incidence and level of infection remained high in the southern part of the district.
1973	light mortality observed in Rayside and Scollard twps, with 20 and 40% levels of infection, respectively
1974	Mortality in Scollard and Rayside twps reached 12.5 and 23.3%, respectively.
1975	Cumulative mortality for 1974-1975 in Rayside and Scollard twps averaged 70%.
1976-1980	not reported

Needle Rusts, *Chrysomyxa ledi* (Alb. & Schw.) d By., *C. ledicola* Lagh.

Host(s): wS, bS [Major]

Year	Remarks
1950-1954	not reported
1955	trace infection levels

(cont'd)

Needle Rusts, *Chrysomyxa ledi* (Alb. & Schw.) d By., *C. ledicola* Lagh. (concl.)

Year		Remarks
1956-1957		not reported
1958	*C. ledi*	low infection levels
1959-1960	*C. ledi*	low infection levels
	C. ledicola	" " "
1961		not reported
1962	*C. ledi*	trace infection levels
	C. ledicola	" " "
1963	*C. ledicola*	low levels reported at widely scattered locations
1964	*C. ledi*	only single trees affected
	C. ledicola	" " " "
1965	*C. ledi*	low levels of infection
	C. ledicola	" " " "
1966-1969		not reported
1970-1971	*C. ledi*	trace infection levels
	C. ledicola	" " "
1972-1973		not reported
1974	*C. ledicola*	trace infection levels
1975-1976		not reported
1977	*C. ledicola*	trace infection levels observed in both townships
1978	*C. ledi*	trace infection levels
	C. ledicola	" " "
1979	*C. ledicola*	trace infection levels
1980		not reported

Ink Spot, *Ciborinia whetzelii* (Seaver) Seaver

Host(s): tA [Major]

Year	Remarks
1950-1957	not reported
1958	varying degrees of infection observed at widely scattered points
1959	moderate-to-severe infection and premature leaf drop in Secord Twp
1960-1963	small pockets of medium-to-heavy infection at widely scattered locations
1964-1969	not reported
1970	The level of infection in Carlyle and Balfour twps averaged 25%.
1971-1972	light levels of infection observed at widely scattered locations
1973	light infection at three locations
1974	light infection observed
1975	caused 34% defoliation in Appleby Twp
1976	caused 50% defoliation in Leinster Twp
1977	trace levels of infection present
1978	Defoliation ranged from 25% to 40% in stands less than 1 ha in size.
1979-1980	low levels of infection observed

White Pine Blister Rust, *Cronartium ribicola* J.C. Fisch.

Host(s): wP [Major]

Year	Remarks
1950-1957	not reported
1958	moderate-to-severe infection reported on large trees in Bigwood Twp
1959	found in varying degrees throughout the district
1960-1961	not reported
1962	found in varying degrees throughout the district
1963	The disease was most prevalent in the southern part of the district. In Nairn Twp 2% of living trees were infected.
1964-1966	low levels of infection
1967	causing light tree mortality in Atlee and Cosby twps
1968	Infection levels were medium to high in Lorne and Allen twps
1969	not reported
1970	averaged 13% incidence in four townships
1971	low levels of infection
1972	medium-to-high incidence and infection levels were recorded in 40 ha of white pine in Scollard Twp
1973-1976	low levels reported
1977-1980	not reported

Hypoxylon Canker, *Hypoxylon mammatum* (Wahl.) Miller

Host(s): tA [Major]

Year	Remarks
1950-1953	not reported
1954	collected in eight townships
1955	In Bigwood Twp 2% of living trees were affected.
1956-1958	not reported
1959-1960	commonly found in the district
1961-1963	not reported
1964-1965	35% of trees infected at one location in Burwash Twp
1967	not reported
1968	Levels of infection in Waters and Carlyle twps were 45 and 52%, respectively.
1969-1972	not reported
1973	medium-to-high level of incidence in four townships
1974-1976	not reported
1977	present at low levels and widespread
1978	not reported
1979	The incidence of infection in four townships in the district averaged 2%.
1980	not reported

Shoot Blight, *Venturia macularis* (Fr.) Mull. & Arx

Host(s): tA

[Major]

Year	Remarks
1950-1959	not reported
1960	commonly found in district
1961	moderate-to-severe foliar damage observed in Burwash and Cascaden twps
1962	Pockets of medium-to-heavy infection were found on open-growing aspen regeneration along roadsides at several locations.
1963	pockets of moderate-to-severe foliar damage observed in Moncrieff, Servos and Rathbun twps
1964	numerous centres of moderate-to-severe infection throughout the district
1965	light infections observed
1966	high levels of infection reported at numerous locations
1967	light infection on roadside regeneration
1968-1969	trace levels of infection observed
1970-1971	not reported
1972	low levels of infection except in Hanmer Twp where medium-to-heavy infection was reported
1973	trace levels of infection
1974	light levels of infection; confined primarily to small diameter trees
1975-1976	not reported
1977	high levels of infection observed in Antrim and Waldie twps
1978-1980	not reported

Rusts of Pine, Sweet-fern Blister Rust, *Cronartium comptoniae* Arth.
Globose Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirat.
Eastern Gall Rust, *Cronartium quercuum* (Berk) Miy. ex. Shirai

Host(s): pine [Major]

Year		Remarks
1950-1953		not reported
1954	*C. quercuum*	trace levels reported
1955-1957		not reported
1958	*C. comptoniae*	commonly found in district
1959-1961		not reported
1962	*C. quercuum*	low levels reported on jack and Scots pine at widely scattered locations
	C. comptoniae	prevalent in the south-central part of the district
1963	*C. quercuum*	Scattered trees were attacked at numerous locations but incidence was generally low.
	C. comptoniae	averaged 14% infection in four townships
1964	*C. comptoniae*	low incidence reported
1965	*C. comptoniae*	34% of stems of young jack pine trees infected in a scarified and seeded area in Moncrieff Twp
1966	*C. comptoniae*	15% of stems of young jack pine trees infected in Moncrieff Twp
1967-1968		not reported
1969	*E. harknessii*	trace levels observed in Scollard Twp

(cont'd)

Rusts of Pine, Sweet-fern Blister Rust, *Cronartium comptoniae* Arth.
Globose Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirat.
Eastern Gall Rust, *Cronartium quercuum* (Berk) Miy. ex. Shirai (concl.)

Year		Remarks
1970	*C. comptoniae*	Incidence levels averaged 25% in three townships.
1971	*C. comptoniae*	comparable to 1970 levels
	E. harknessii	low incidence
1972	*C. comptoniae*	trace levels reported
1973	*C. comptoniae*	High levels of infection occurred in Bowell Twp
	E. harknessii	widespread but at trace levels of infection
1974	*E. harknessii*	low incidence
1975	*C. comptoniae*	10% of trees affected in Hagar Twp
1976	*C. comptoniae*	widespread but at low levels
1977-1979		not reported
1980	*E. harknessii*	trace levels observed in immature stands

Other Noteworthy Diseases

Black Knot of Cherry, *Apiosporina morbosa* (Schw.) Arx.

Host(s): cherry, plum [Minor]

Year	Remarks
1950-1978	not reported
1979	common throughout the district
1980	not reported

Pine Needle Rust, *Coleosporium asterum* (Diet.) Syd.

Host(s): pines [Major]

Year	Remarks
1950-1964	not reported
1965	light infections throughout the district
1966-1980	not reported

Cytospora Canker, *Cytospora kunzei* Sacc.

Host(s): spruce, wP, tamarack [Major]

Year	Remarks
1950-1965	not reported
1966	25% of trees cankered in a spruce plantation in Lorne Twp
1967	not reported
1968	light infection at one location
1969-1980	not reported

Tar Spot Needle Cast, *Davisomycella ampla* (Darker) Darker

Host(s): jP [Major]

Year	Remarks
1950-1959	not reported
1960	moderate-to-heavy infections at scattered locations
1961	not reported
1962	common throughout the district
1963	individual trees moderately to severely affected and pockets of light infection found throughout the district
1964-1965	not reported
1966	light infection throughout the district
1967-1978	not reported
1979-1980	trace infection levels throughout the district

Eutypella Canker, *Eutypella parasitica* Davidson & Lorenz

Host(s): sM, rM [Major]

Year	Remarks
1950-1961	not reported
1962	common throughout maple stands in the district
1963-1980	not reported

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet

Host(s): pine [Major]

Year	Remarks
1950-1972	not reported
1973	infection found in an 8-ha red pine plantation in Morgan Twp; incidence and infection levels reported to be moderate to severe
1974-1980	not reported

Needle Cast, *Lophodermium pinastri* (Schrad. ex Hook) Chev.

Host(s): pine [Major]

Year	Remarks
1950-1956	not reported
1957	trace levels of infection
1958-1959	not reported
1960	found commonly in the district
1961-1980	not reported

White Trunk Rot, *Phellinus igniarius* (Fr.) Quél.

Host(s): tA, wB [Major]

Year	Remarks
1950-1953	not reported
1954	widespread throughout the district
1955-1959	not reported
1960	conks observed commonly in the district
1961-1980	not reported

Butt Rot of Conifers, *Polyporus tomentosus* Fr.

Host(s): conifers [Major]

Year	Remarks
1950-1970	not reported
1971	caused an average of 1.6% mortality in spruce plantations in Hess and Servos twps
1972-1980	not reported

ABIOTIC DAMAGE

Drought

Year	Remarks
1950-1963	not reported
1964	As a result of below-average rainfall in 1963, premature leaf drop was common on white birch, red maple and red oak in the southern part of the district.
1965-1975	not reported
1976	Premature leaf browning was common throughout the district and was most severe on high, rocky sites.
1977-1980	not reported

Frost

Year	Remarks
1950-1963	not reported
1964-1965	Severe frosts that occurred in late May and early June caused widespread damage to new shoots of balsam fir and white spruce trees.
1966	not reported
1967	light damage to conifers in Cosby Twp
1968-1971	not reported
1972	moderate-to-severe damage observed on balsam fir and white spruce trees in the Lake Wanapitei area and in Cascaden Twp
1973-1979	not reported
1980	moderate-to-severe damage to aspen and balsam poplar at numerous locations

Rodent

Year	Remarks
1950-1959	not reported
1960	Girdling of stems occurred on a wide variety of tree species, especially in the central and southeastern parts of the district.
1961-1980	not reported

Salt

Year	Remarks
1950-1965	not reported
1966	moderate-to-severe injury to red and white pine shelterbelts along Hwy 69 at Burwash
1967-1980	not reported

Wind Storm

Year	Remarks
1950-1969	not reported
1970	Severe damage to a wide variety of hosts was reported in the Lake Ramsey area south of Sudbury.
1973	Severe damage occurred on many tree species in the Friday Lake area in Rhodes Twp.
1974	High winds caused extensive damage on an island in Eighteen Mile Bay in the southeastern part of the district.
1975-1980	not reported

Winter Drying

Year	Remarks
1950-1958	not reported
1959	severe discoloration of pine foliage over sizeable areas, especially along windbreaks and in low-lying areas
1960-1962	not reported
1963	caused severe discoloration to single trees at numerous locations
1964	light damage to young conifers at several points
1965	not reported
1966-1967	severe browning of foliage in a red pine plantation in Burwash Twp
1968-1970	not reported
1971	light damage in a small, mixed white and red pine plantation in the Burwash Management Unit
1972	not reported
1973	common in the district
1974-1977	not reported
1978	light damage levels on red, jack and Scots pine at several locations
1979-1980	not reported

APPENDICES

APPENDIX A

DECIDUOUS HOST

Common Name	Scientific Name	Abbreviations
Alder	*Alnus* spp.	Al
Apple	*Malus* spp.	Ap
Ash, black	*Fraxinus nigra* Marsh.	As
Aspen, largetooth	*Populus grandidentata* Michx.	lA
trembling	*tremuloides* Michx.	tA
Basswood	*Tilia* spp.	Ba
Beech	*Fagus grandifolia* Ehrh.	Be
Birch, white	*Betula papyrifera* Marsh.	wB
yellow	*alleghaniensis* Britt.	yB
Butternut	*Juglans cinerea* L.	Bu
Cherry, eastern choke	*Prunus virginiana* L.	ecCh
pin	*pensylvanica* L.f	pCh
Elm, white	*Ulmus americana* L.	wE
Horse-chestnut	*Aesculus hippocastanum* L.	hChe
Ironwood	*Ostrya* spp.	I
Maple, Manitoba	*Acer negundo* L.	mM
red	*rubrum* L.	rM
sugar	*saccharum* Marsh.	sM
Mountain-ash, American	*Sorbus americana* Marsh.	aMo
Oak, bur	*Quercus macrocarpa* Michx.	bO
red	*rubra* L.	rO
Poplar, balsam	*Populus balsamifera* L.	bPo
Carolina	*eugenei* Simon-Louis	cPo
Lombardy	*nigra* L.	lPo
silver	*alba* L.	sPo
Willow	*Salix* spp.	W

APPENDIX B

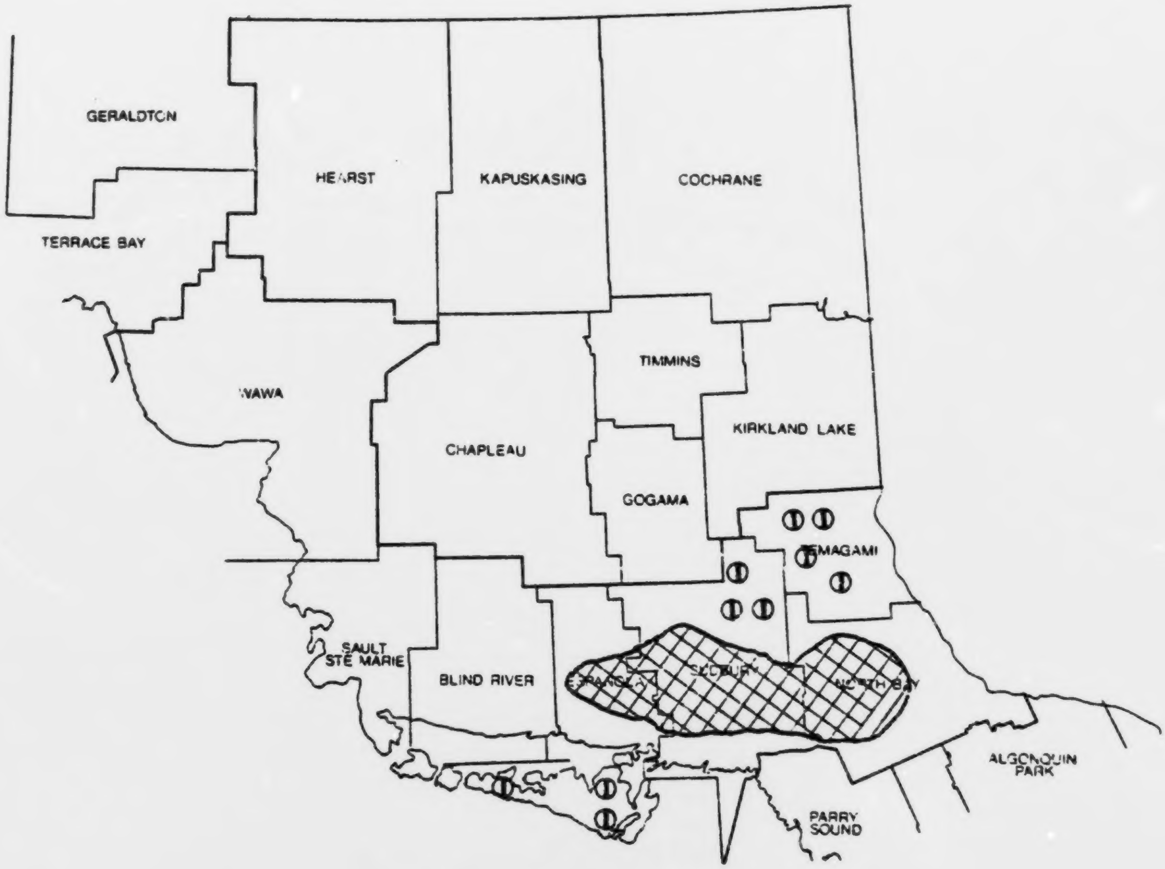
CONIFEROUS HOST

Common Name	Scientific Name	Abbreviations
Cedar, eastern white	*Thuja occidentalis* L.	eC
Fir, balsam	*Abies balsamea* (L.) Mill.	bF
Larch	*Larix laricina* (Du Roi) K. Koch	tL
Pine, Austrian	*Pinus nigra* Arn.	aP
eastern white	*strobus* L.	wP
jack	*banksiana* Lamb.	jP
mugho	*mugho* Turra	mP
red	*resinosa* Ait.	rP
Scots	*sylvestris* L.	scP
Spruce, black	*Picea mariana* (Mill.) B.S.P.	bS
Colorado	*pungens* Engelm.	colS
Norway	*abies* (L.) Karst.	nS
red	*rubens* Sarg.	rS
white	*glauca* (Moench) Voss	wS

APPENDIX C

MAPS - NORTHEASTERN ONTARIO

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Birch Skeletonizer

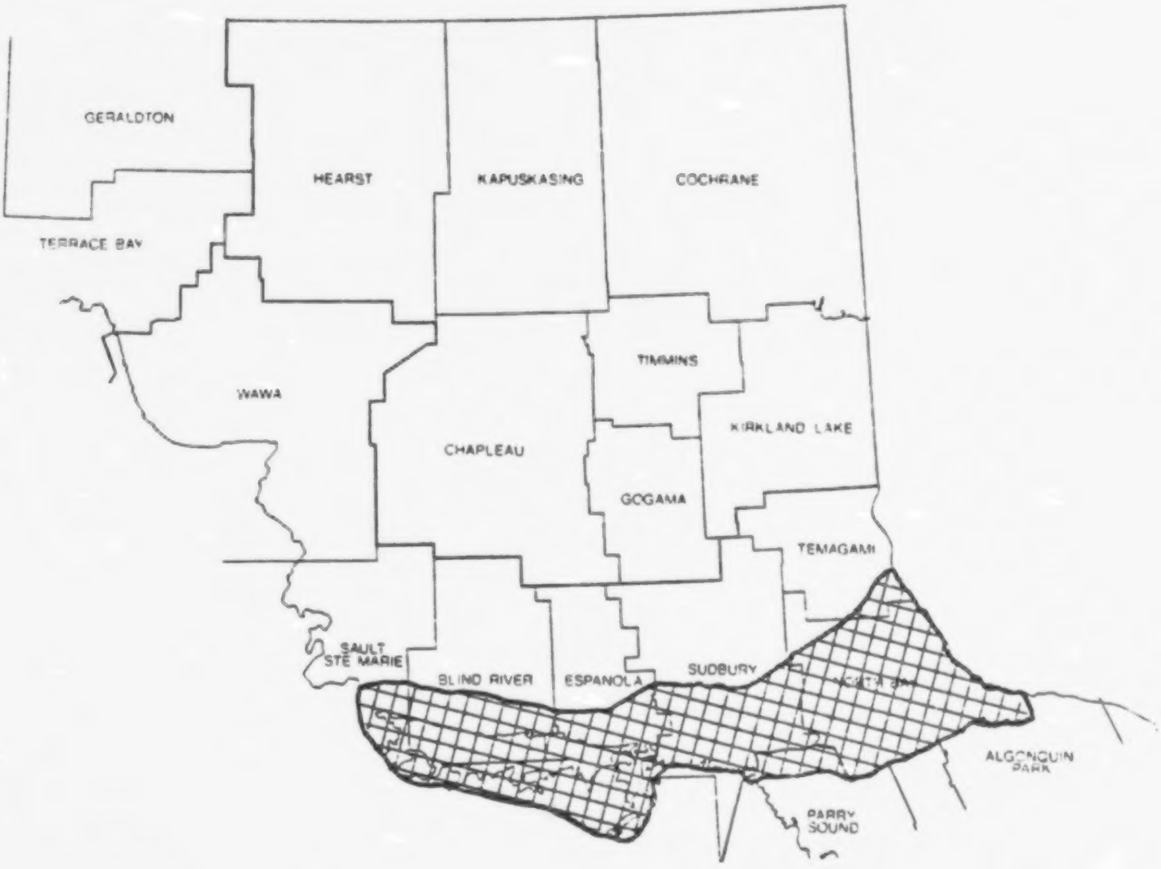
Areas within which defoliation
occurred in 1950

LEGEND

Light defoliation Ⓘ

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



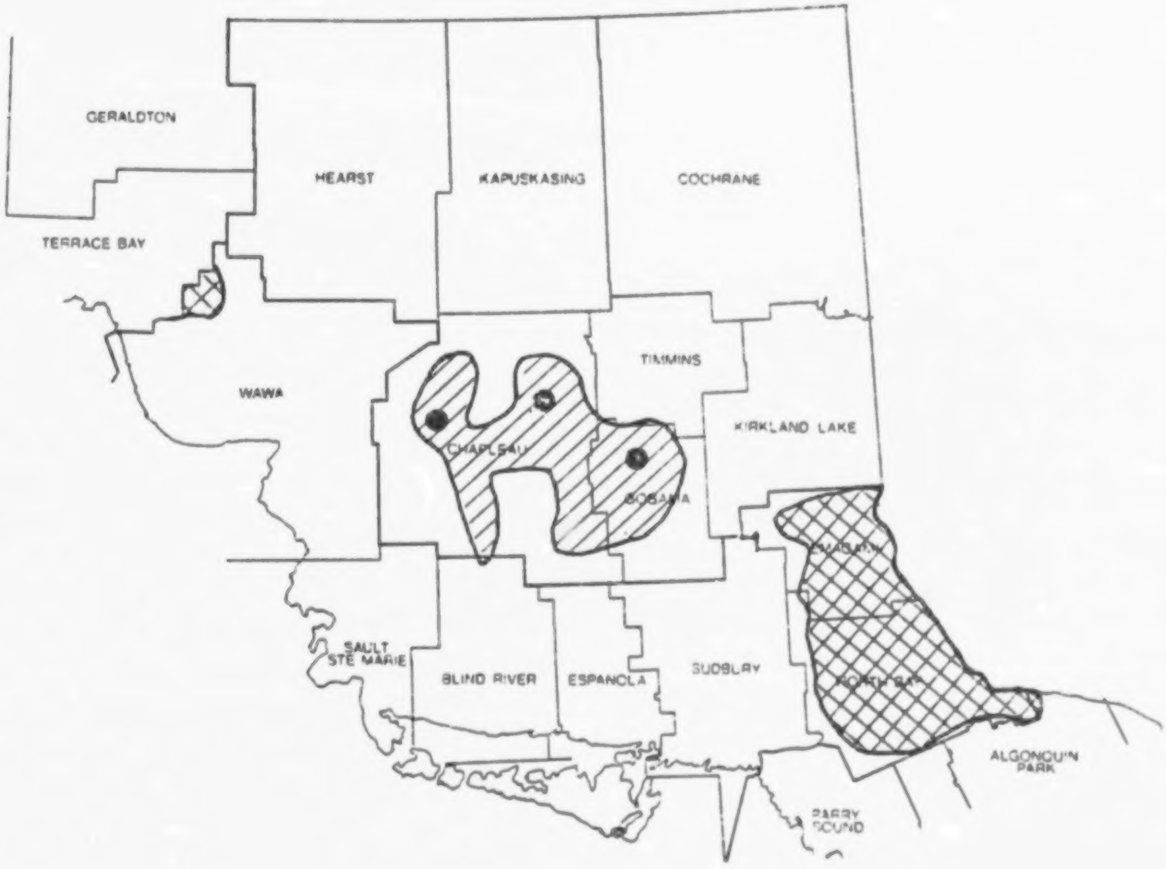
Birch Skeletonizer

Areas within which defoliation occurred in 1961

LEGEND

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Birch Skeletonizer

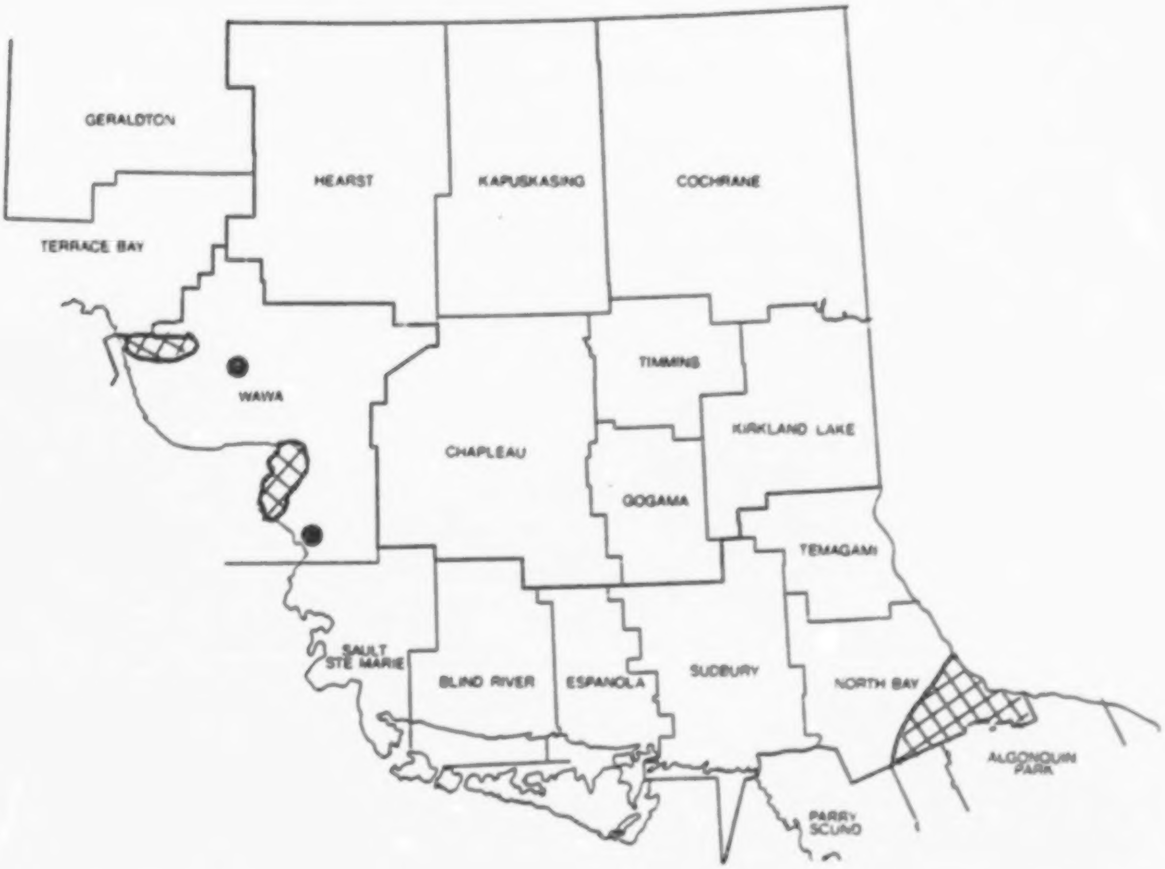
Areas within which defoliation
occurred in 1963

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▦

NORTHEASTERN ONTARIO



Birch Skeletonizer

0 Miles 60

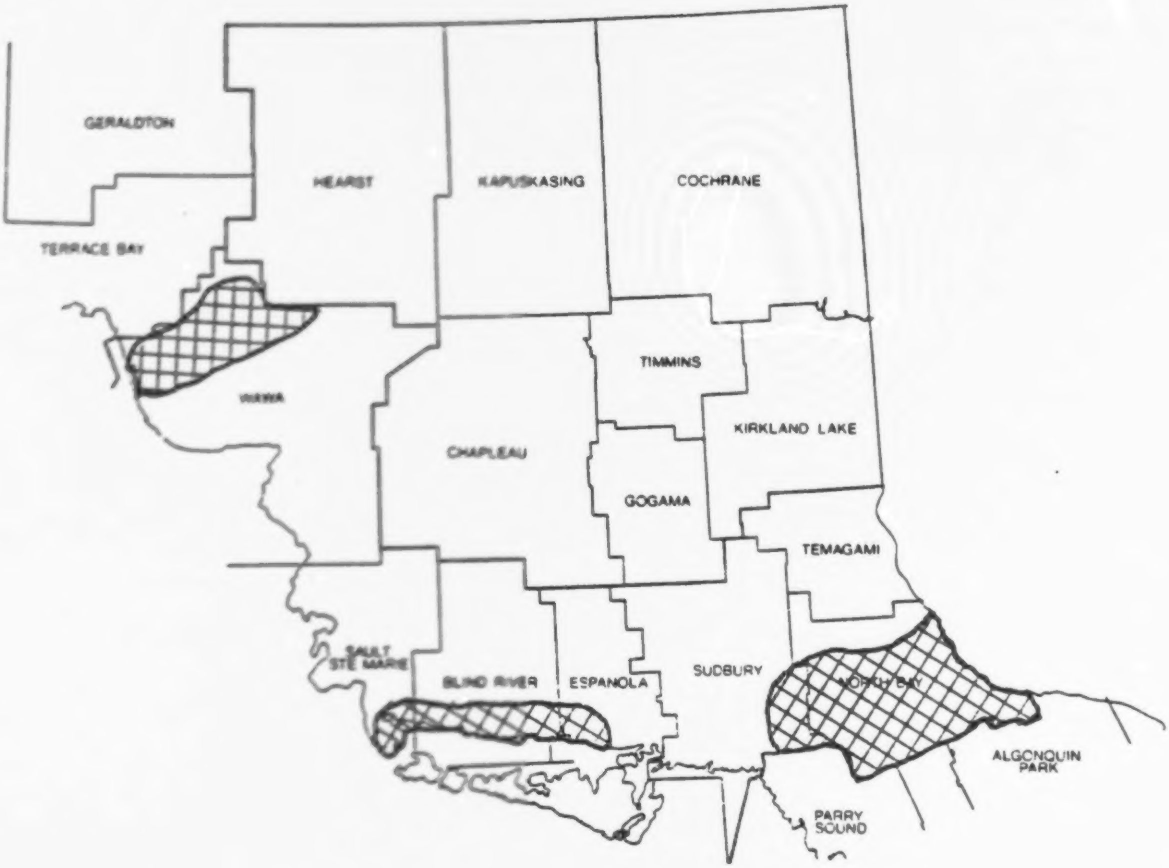
0 Kilometres 96

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



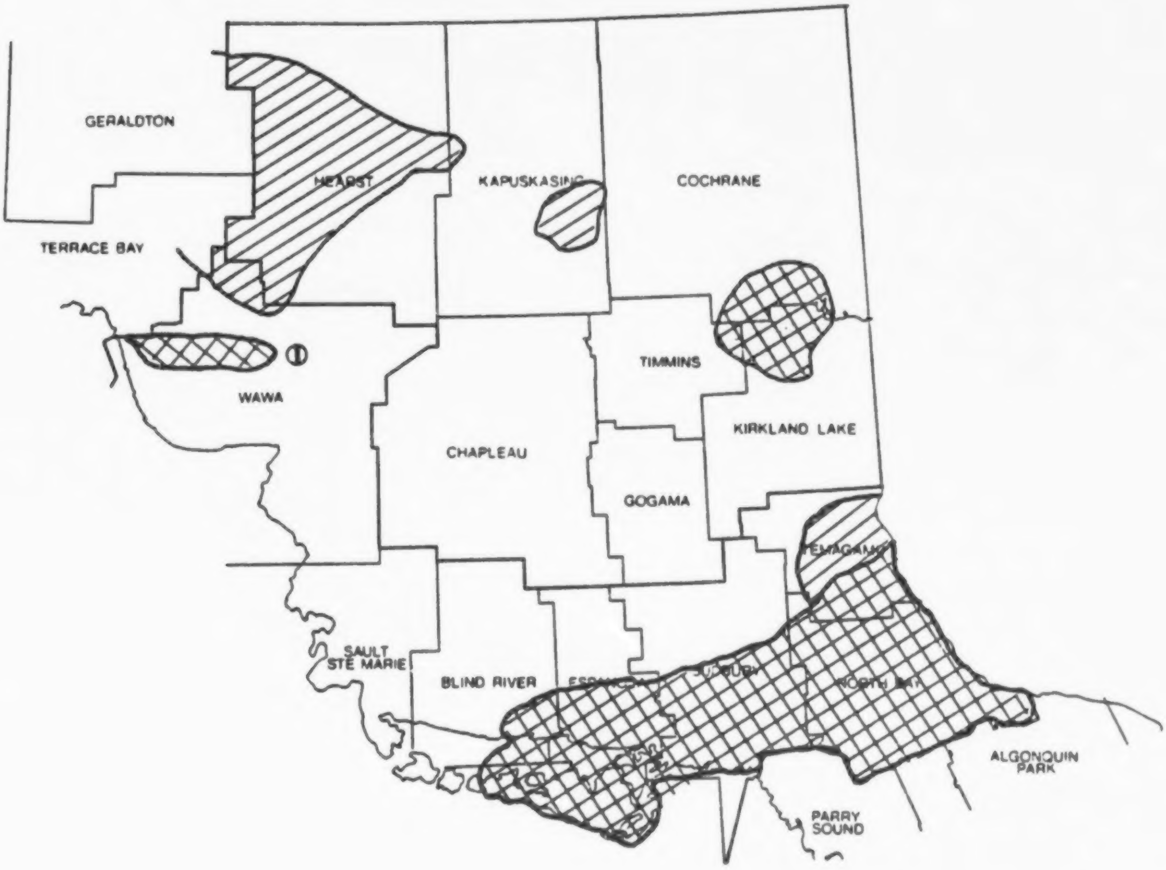
Birch Skeletonizer

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



Birch Skeletonizer

0 Miles 60
0 Kilometres 96

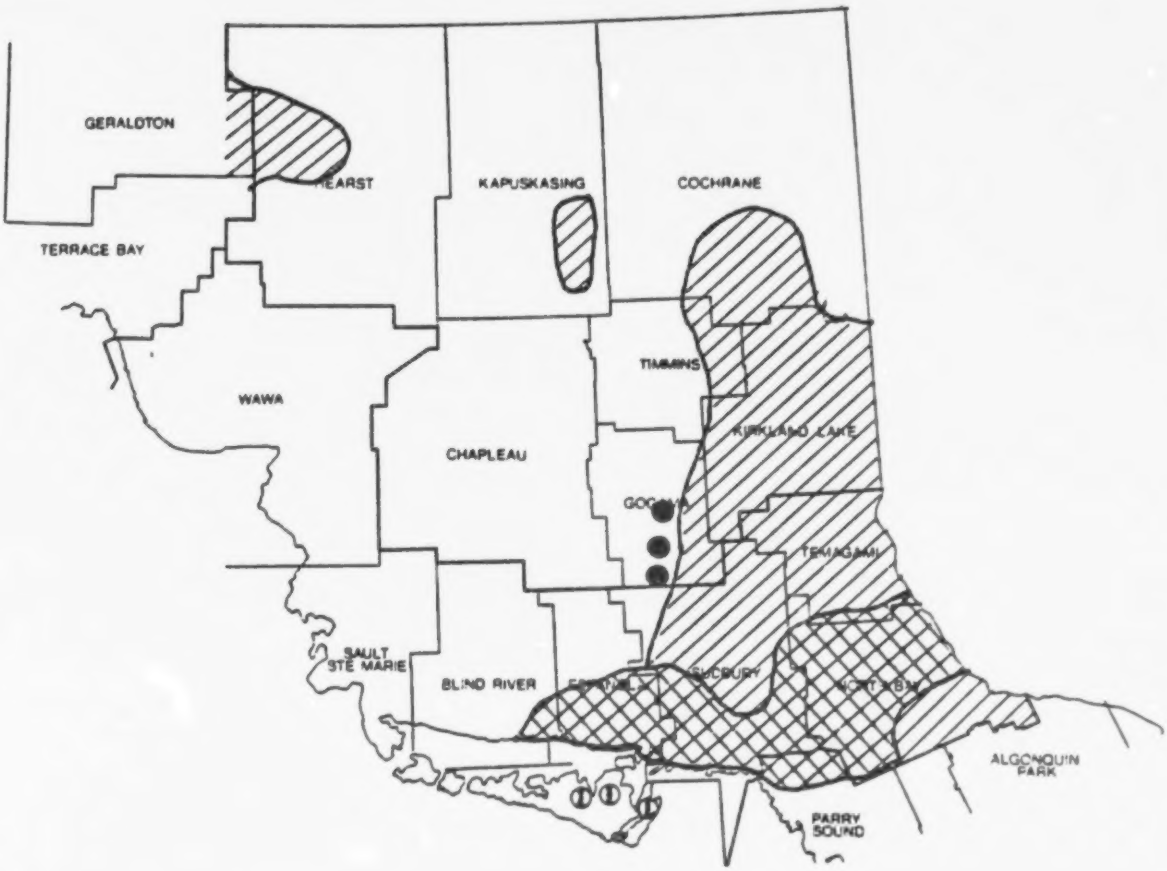
Areas within which defoliation
occurred in 1972

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ▦

NORTHEASTERN ONTARIO



Birch Skeletonizer

Areas within which defoliation occurred in 1973

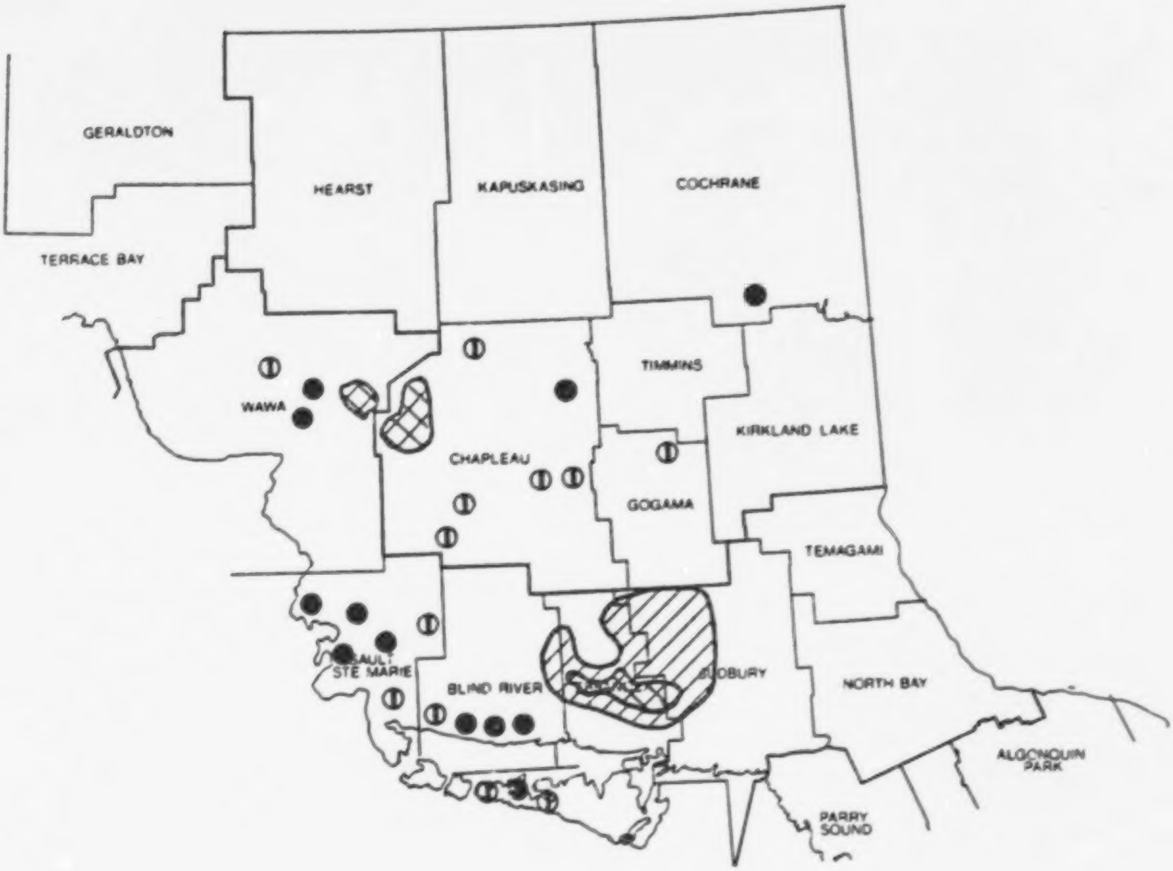
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Large Aspen Tortrix

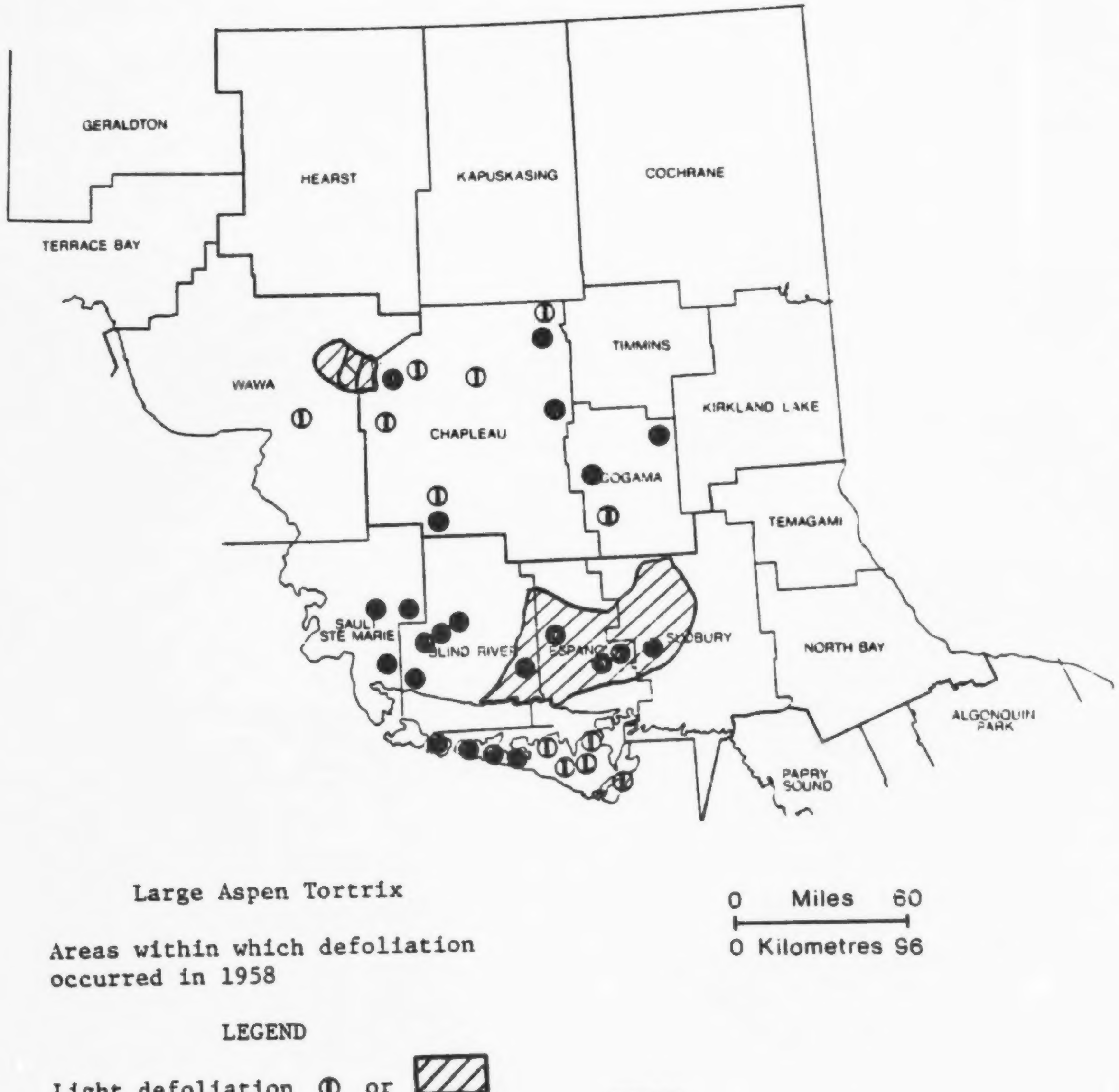
Areas within which defoliation occurred in 1957

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



Large Aspen Tortrix

0 Miles 60

0 Kilometres 96

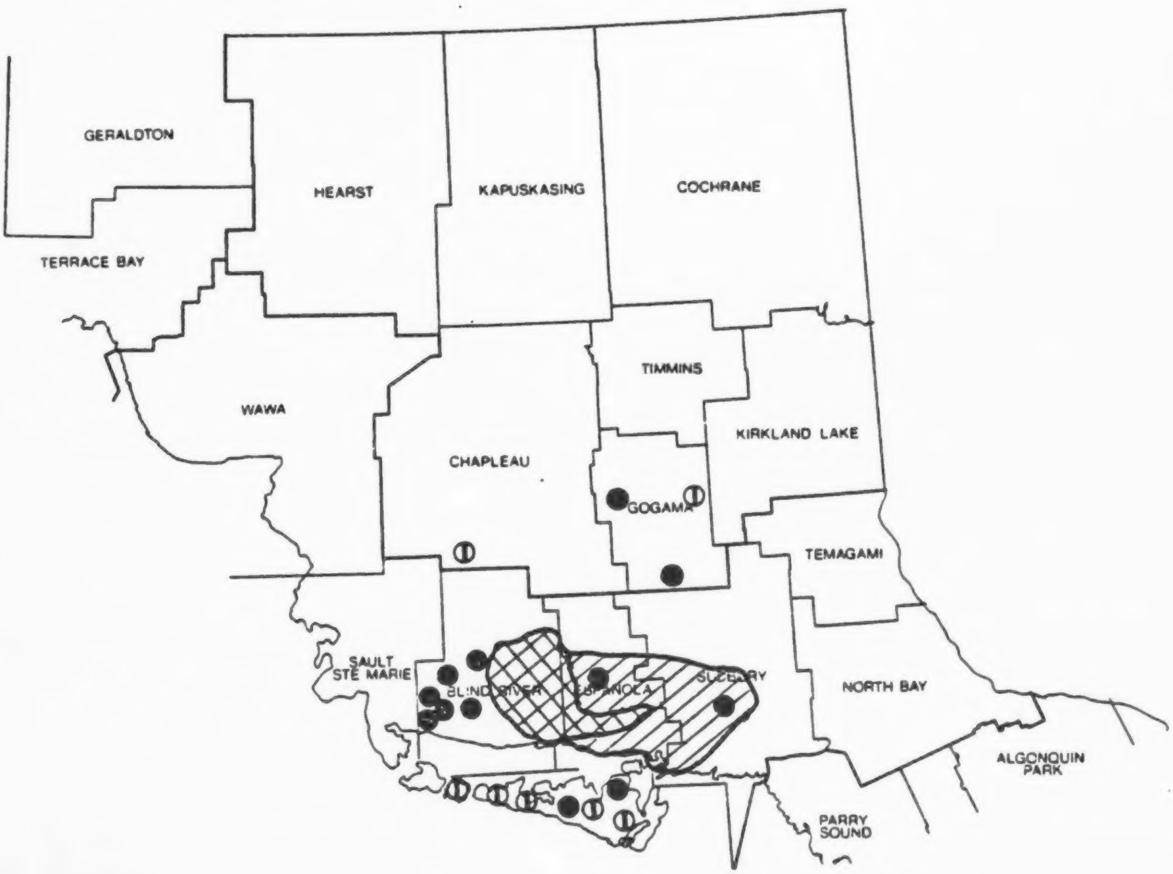
Areas within which defoliation occurred in 1958

LEGEND

Light defoliation ◑ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



Large Aspen Tortrix

Areas within which defoliation occurred in 1959

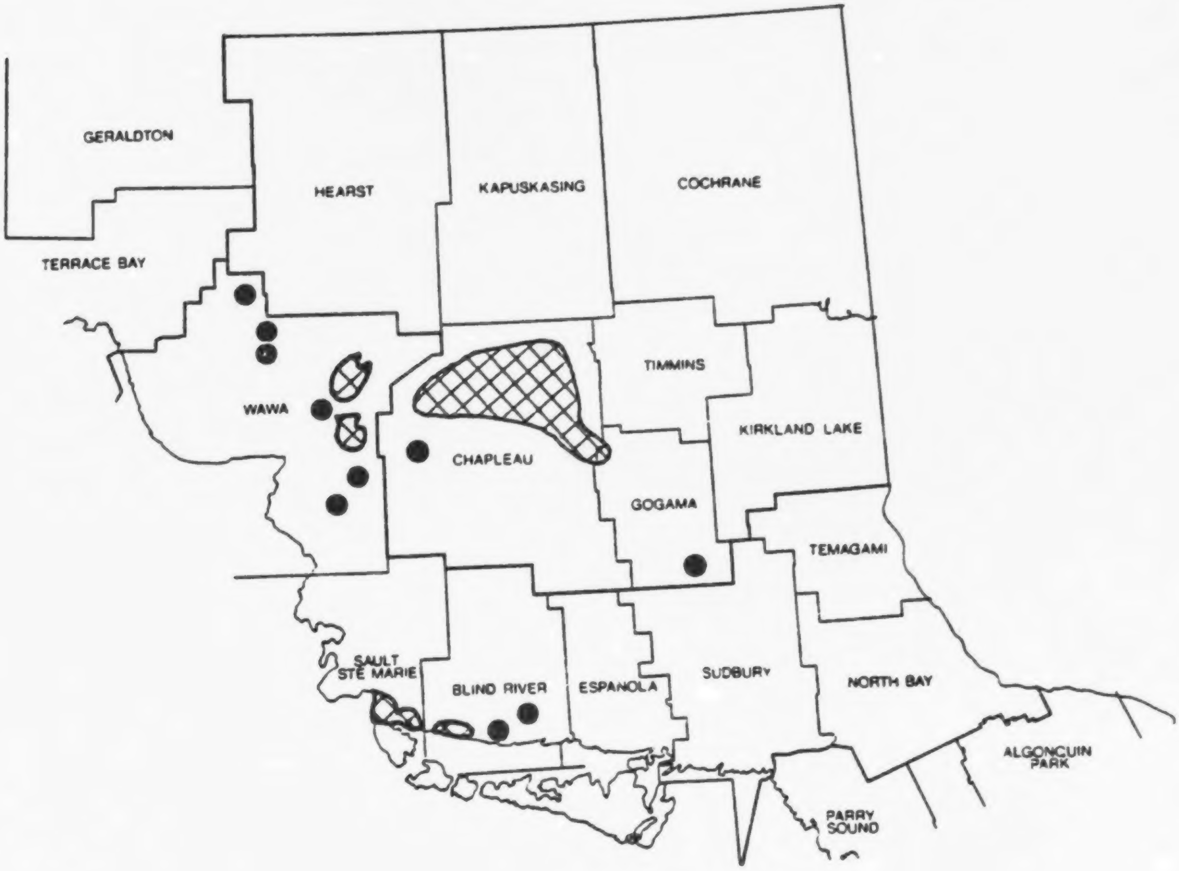
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



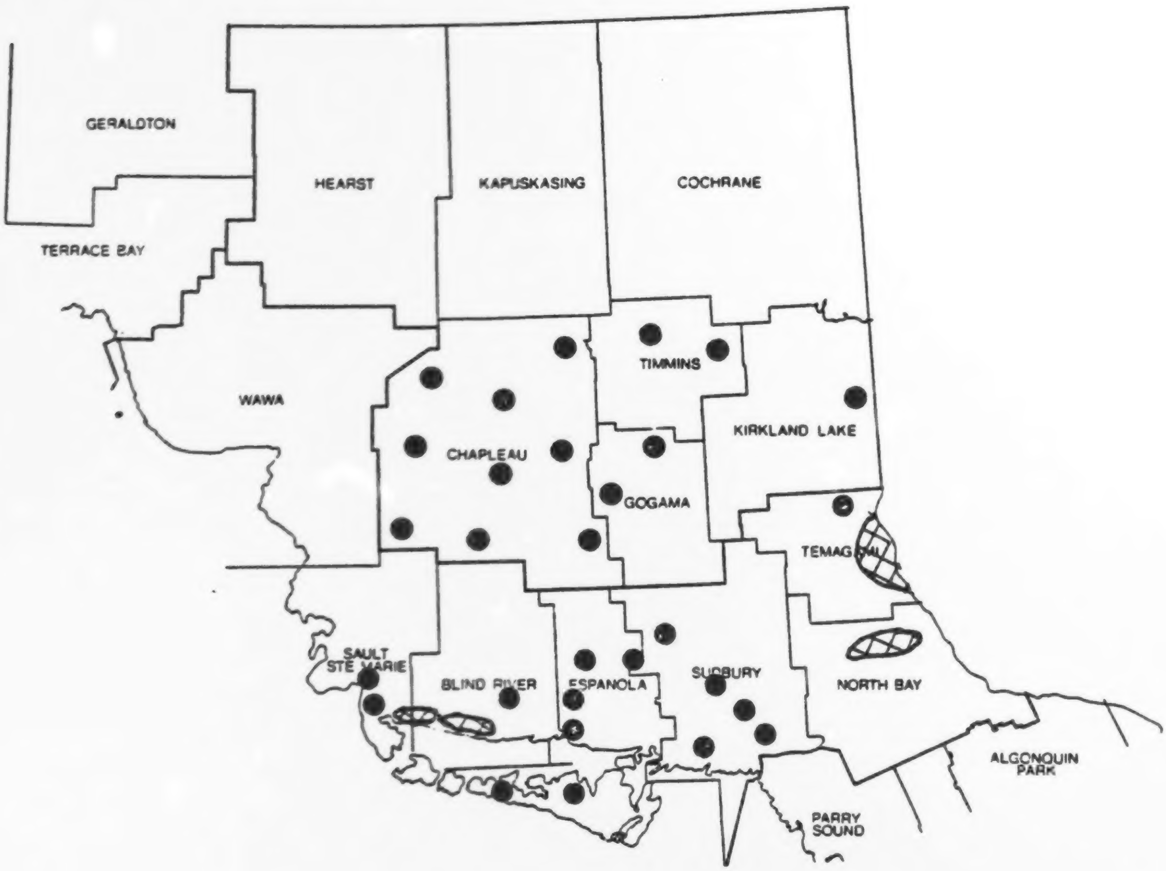
Large Aspen Tortrix

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Large Aspen Tortrix

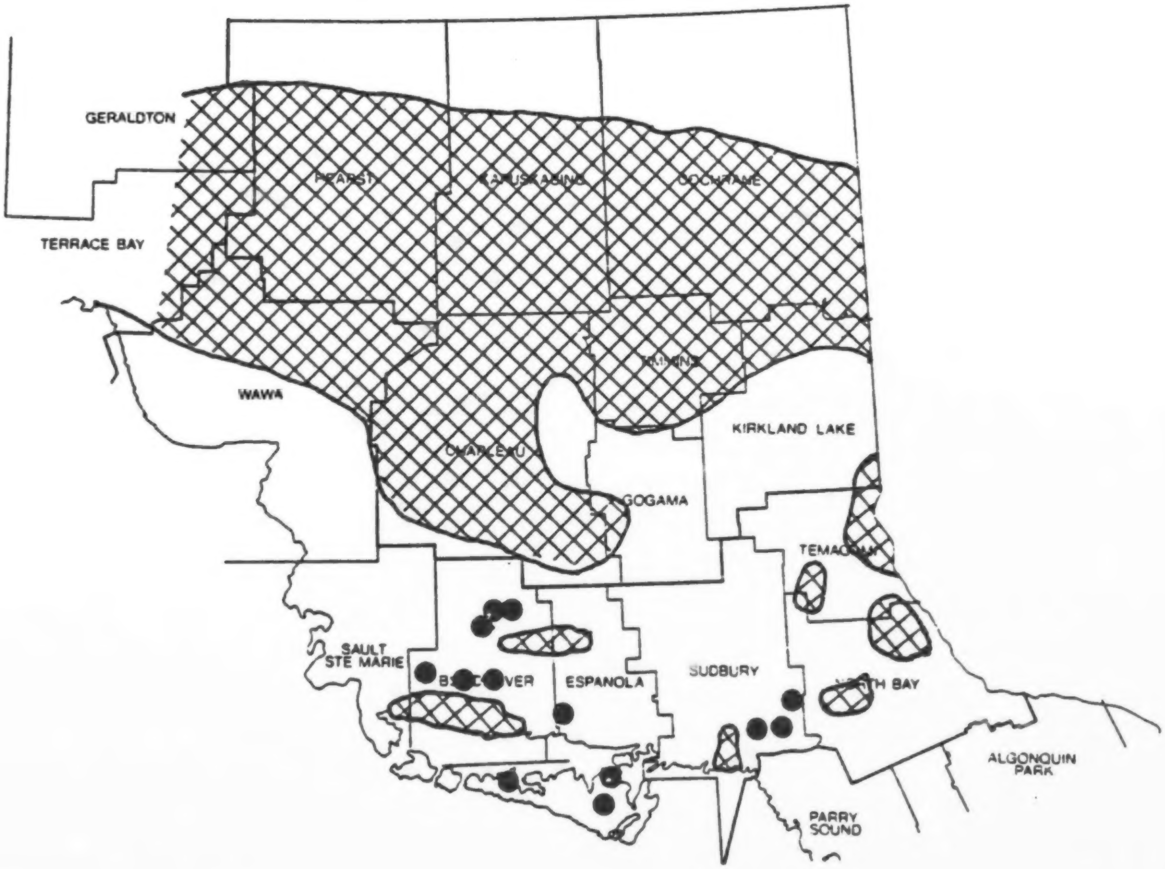
0 Miles 60
0 Kilometres 96

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

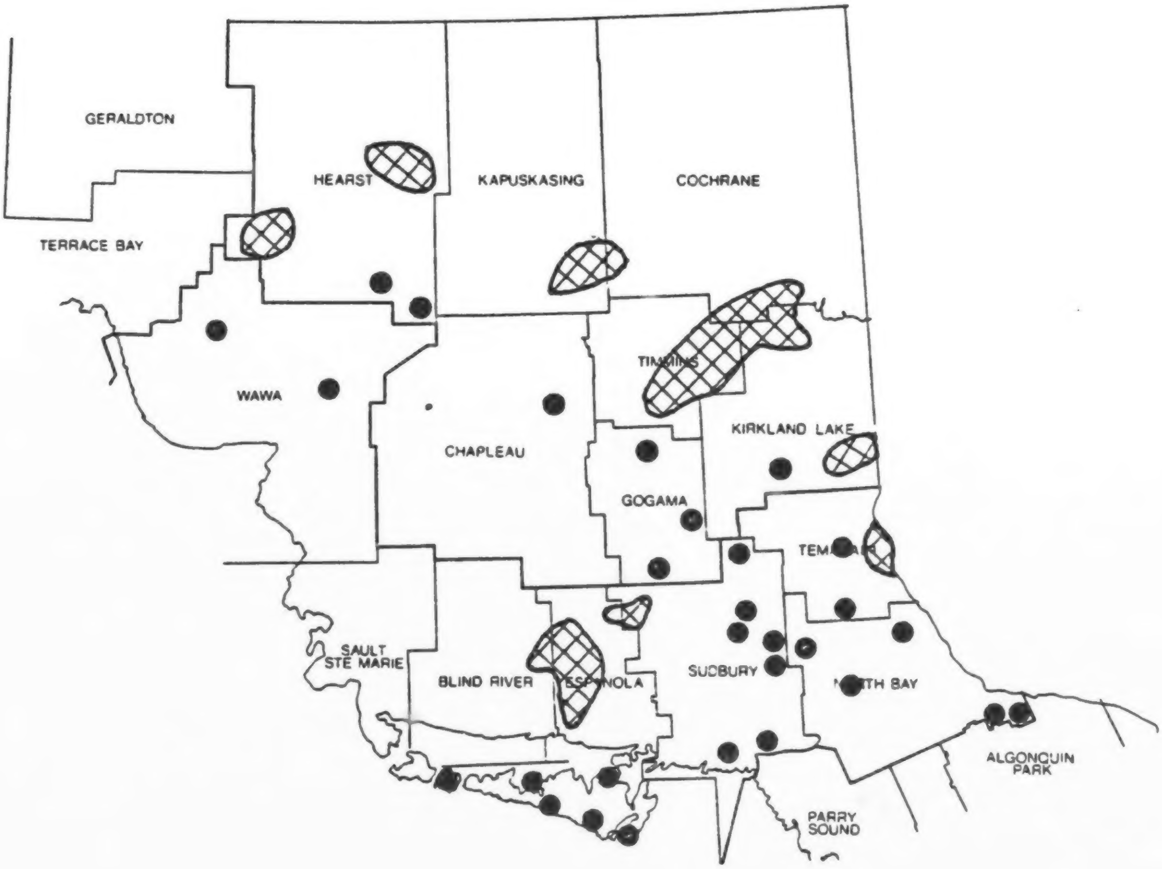
Large Aspen Tortrix

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Large Aspen Tortrix

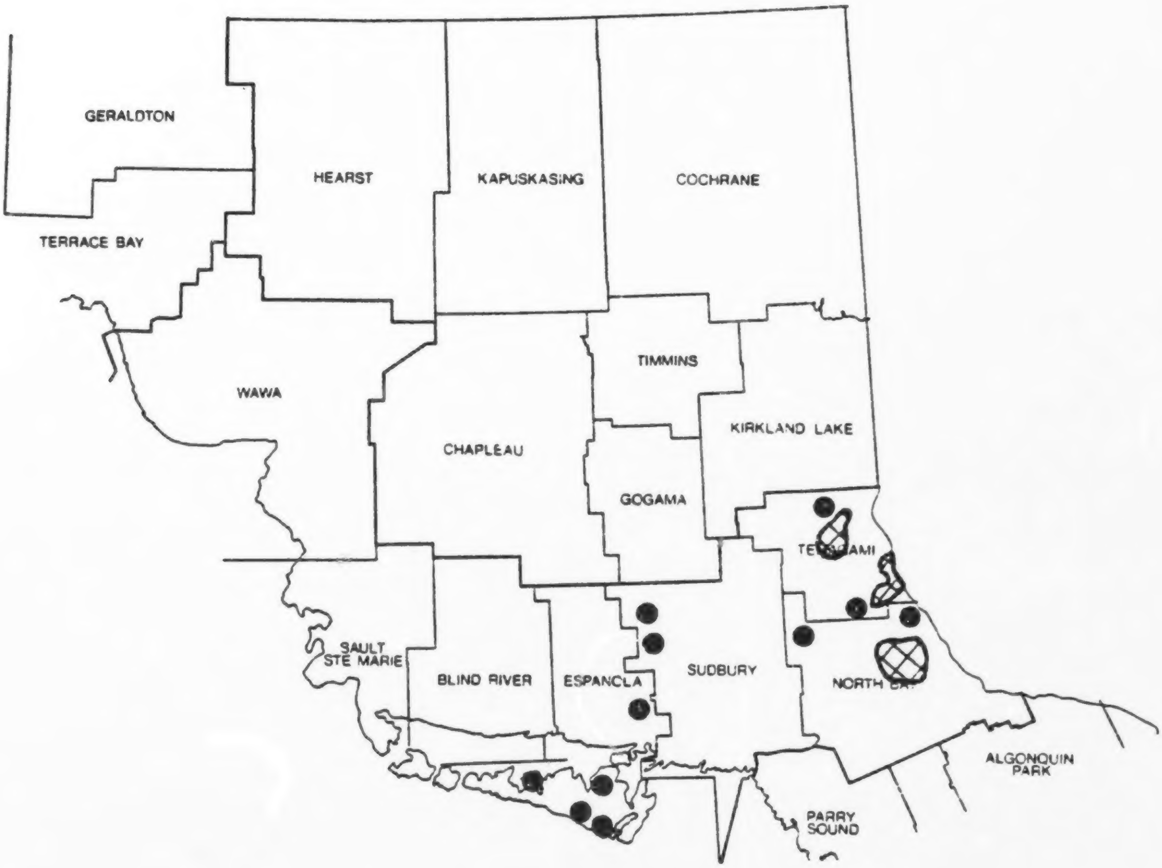
Areas within which defoliation occurred in 1973

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

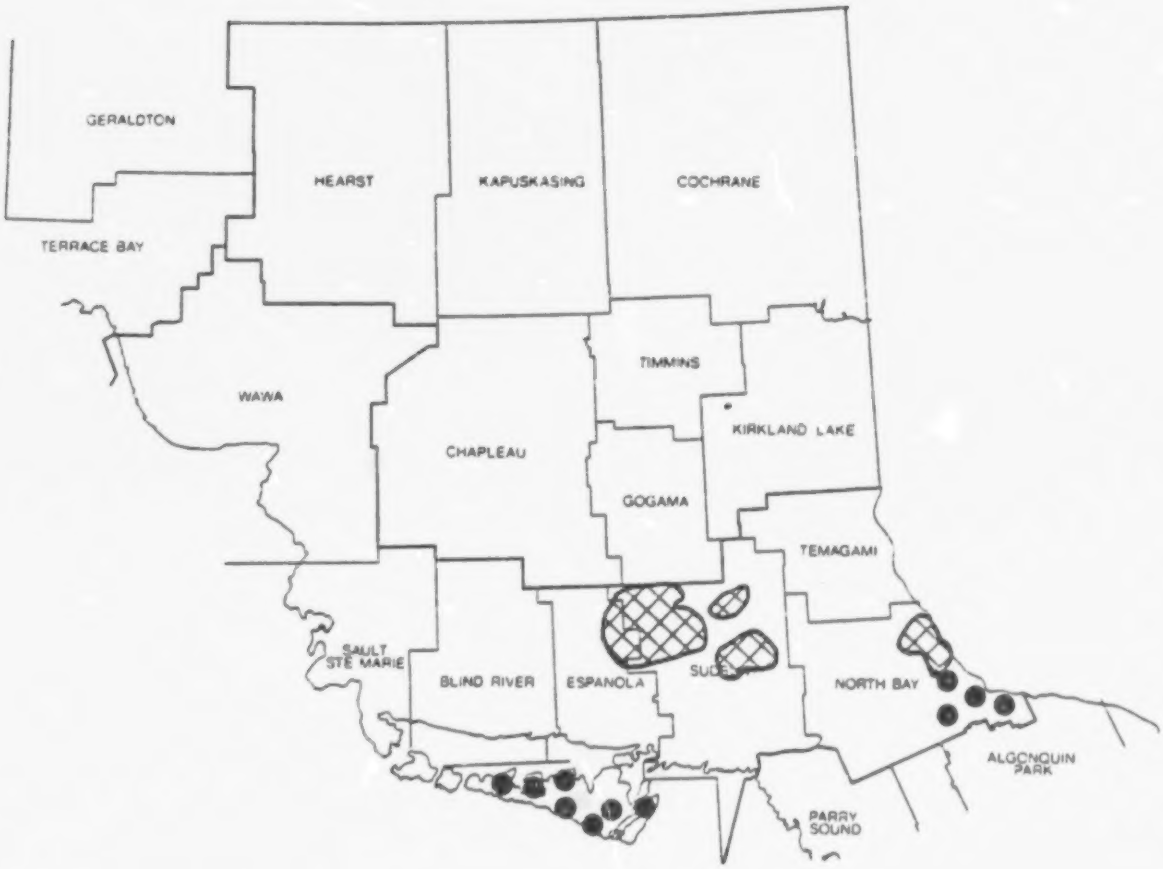
Large Aspen Tortrix

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Large Aspen Tortrix

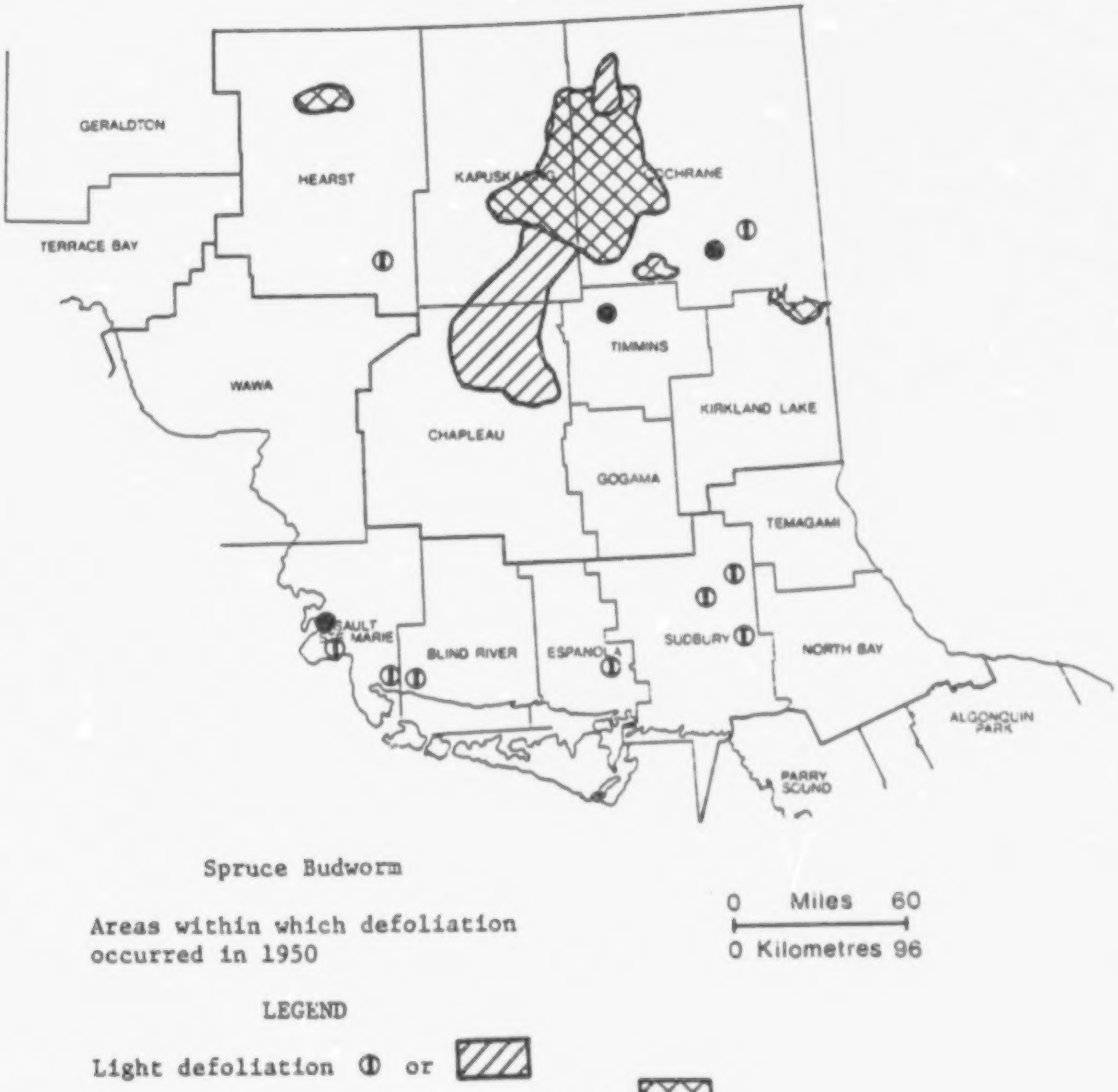
Areas within which defoliation occurred in 1975

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

0 Miles 60

0 Kilometres 96

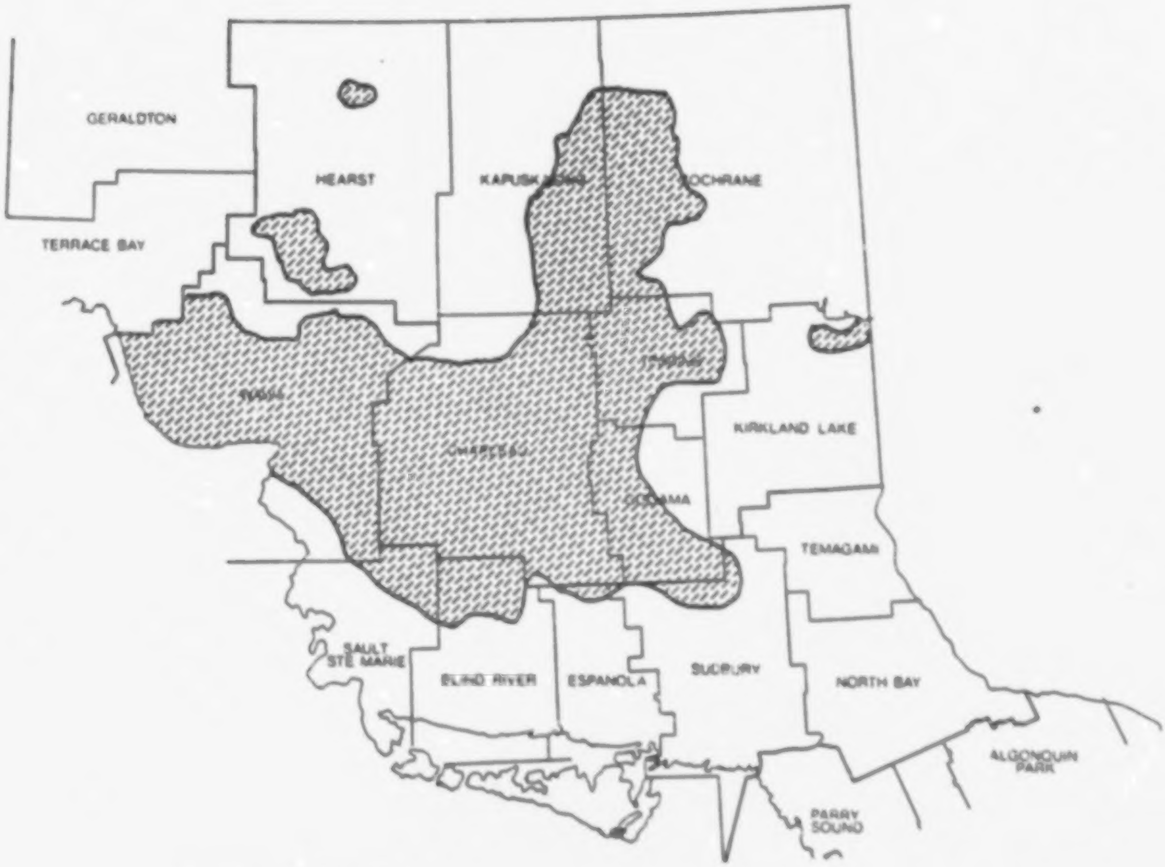
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▦

NORTHEASTERN ONTARIO



Spruce Budworm

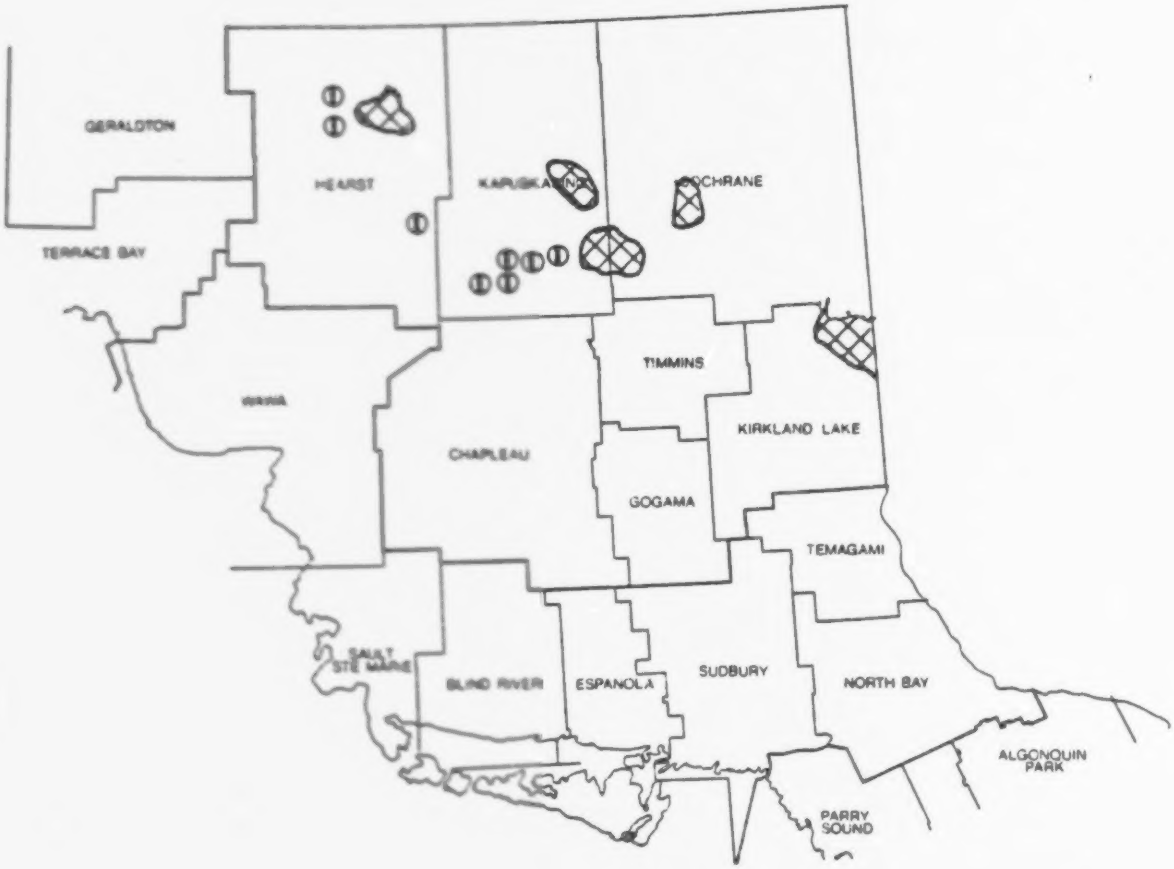
Areas within which balsam fir whole tree and top mortality occurred in 1950

0 Miles 60
0 Kilometres 96

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Spruce Budworm

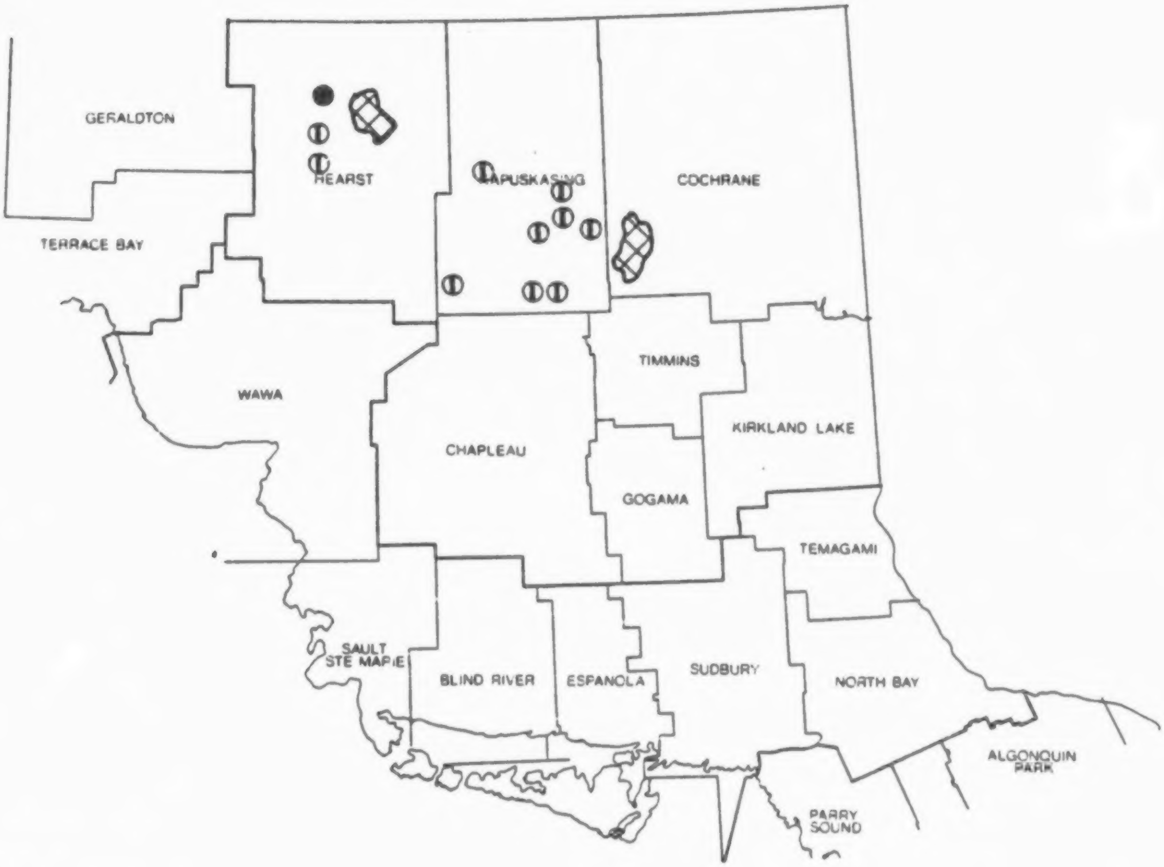
Areas within which defoliation
occurred in 1951

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



Spruce Budworm

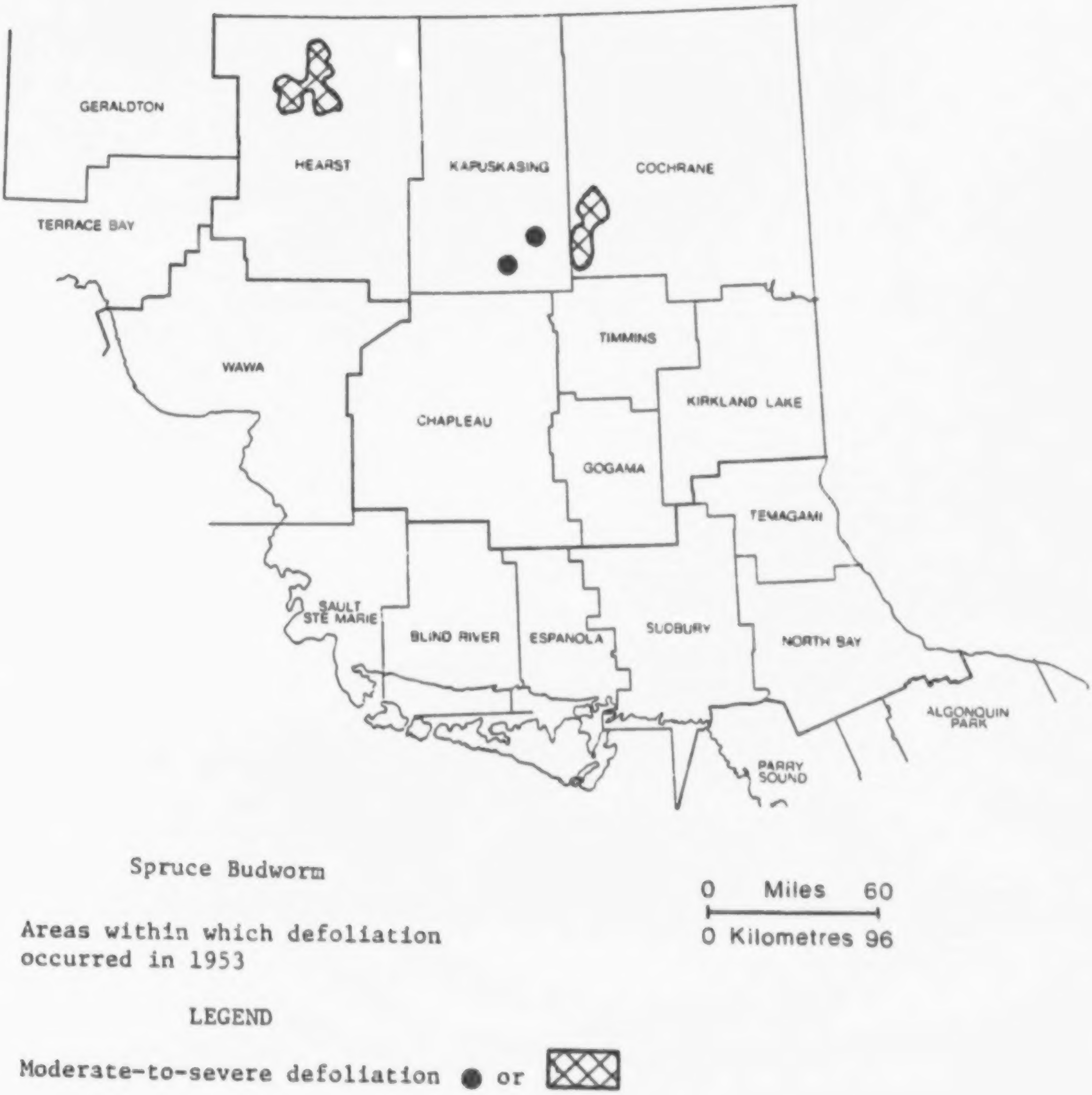
Areas within which defoliation occurred in 1952

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

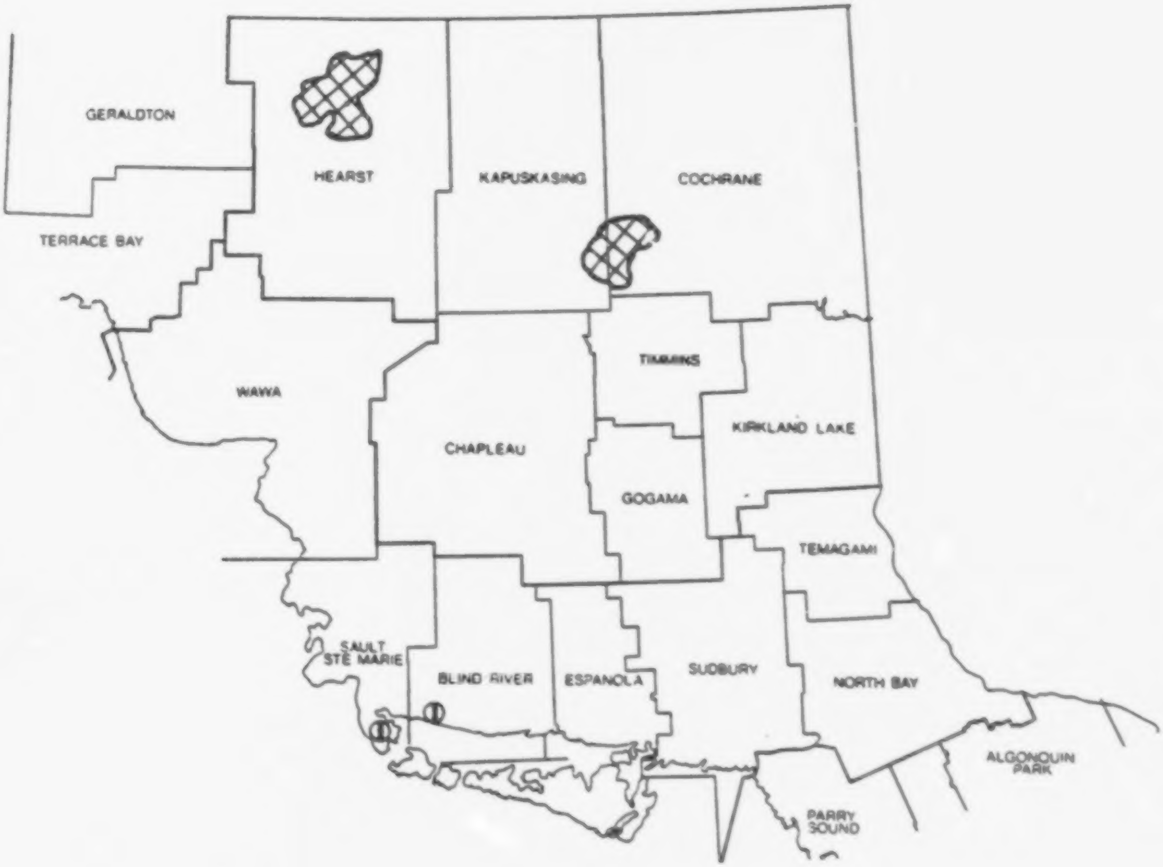
0 Miles 60
0 Kilometres 96

Areas within which defoliation occurred in 1953

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

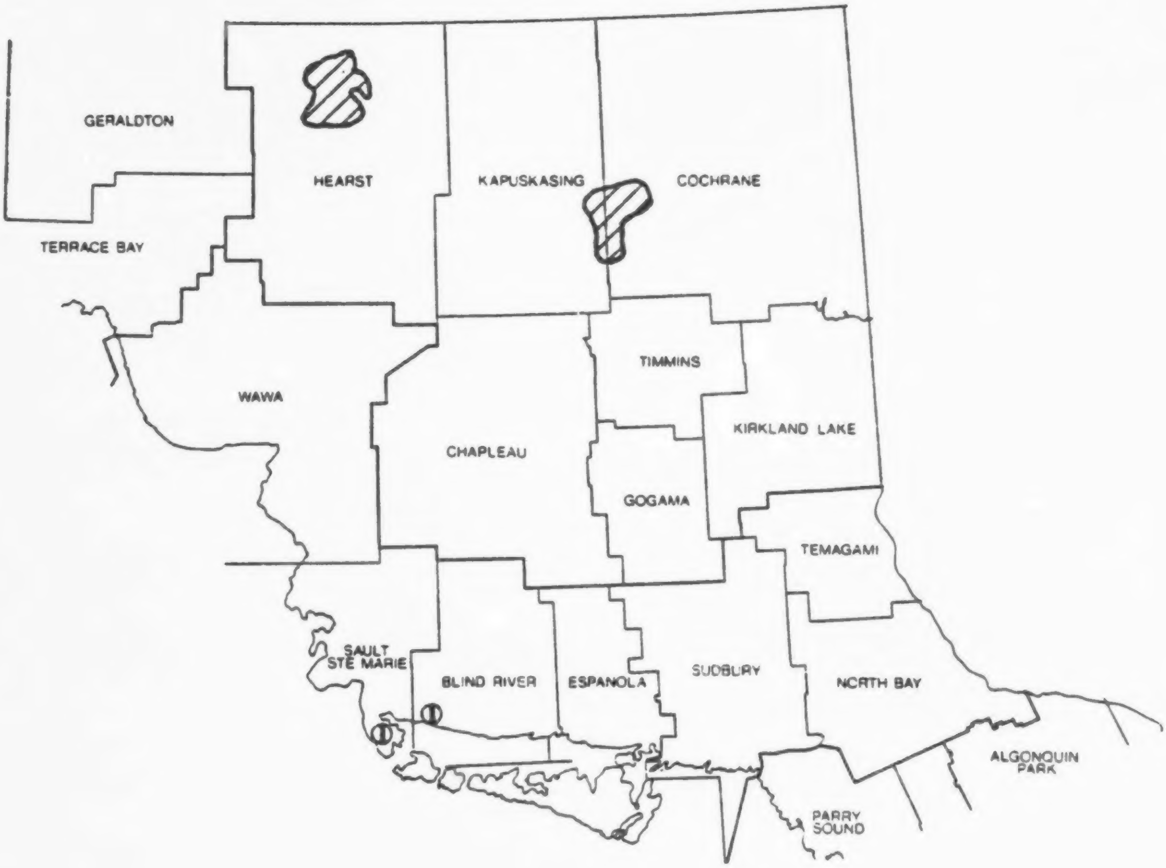
Areas within which defoliation occurred in 1954

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



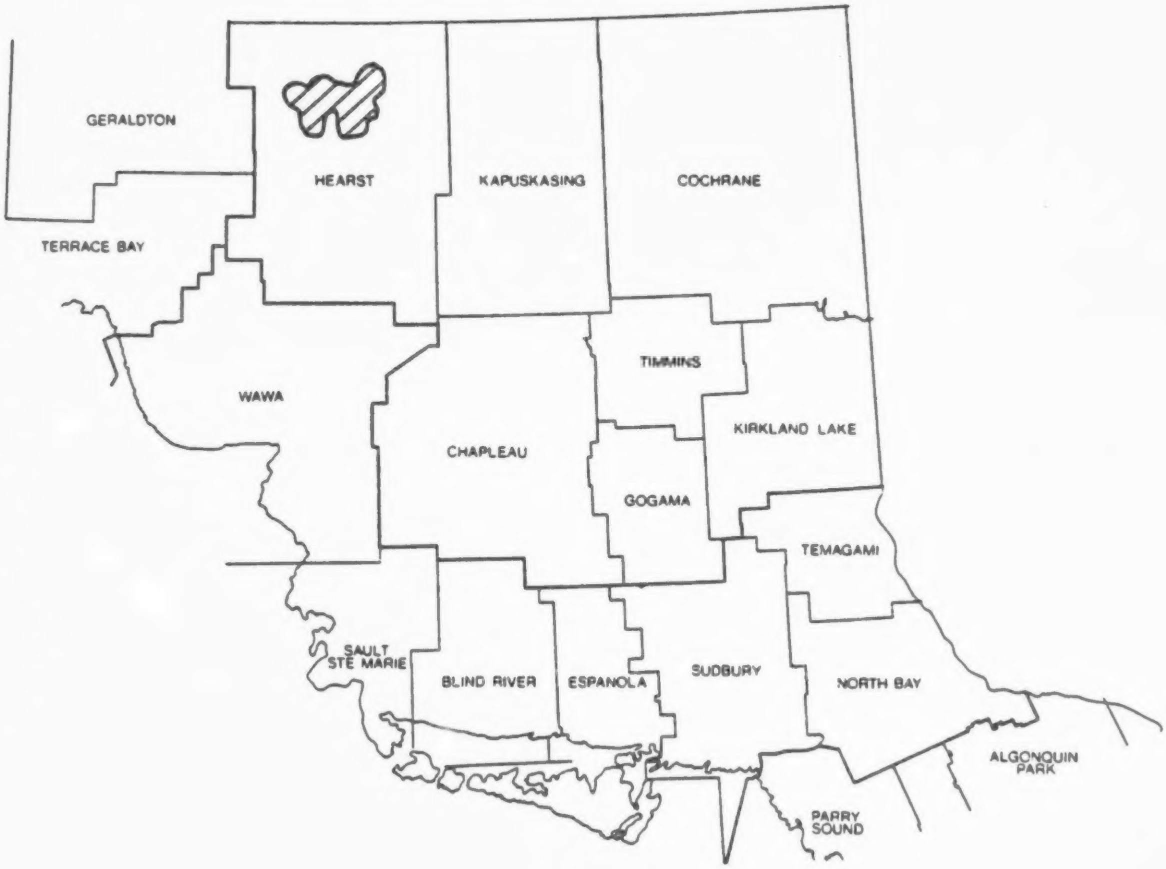
Spruce Budworm

Areas within which defoliation occurred in 1955

LEGEND

Light defoliation ① or ▨

NORTHEASTERN ONTARIO



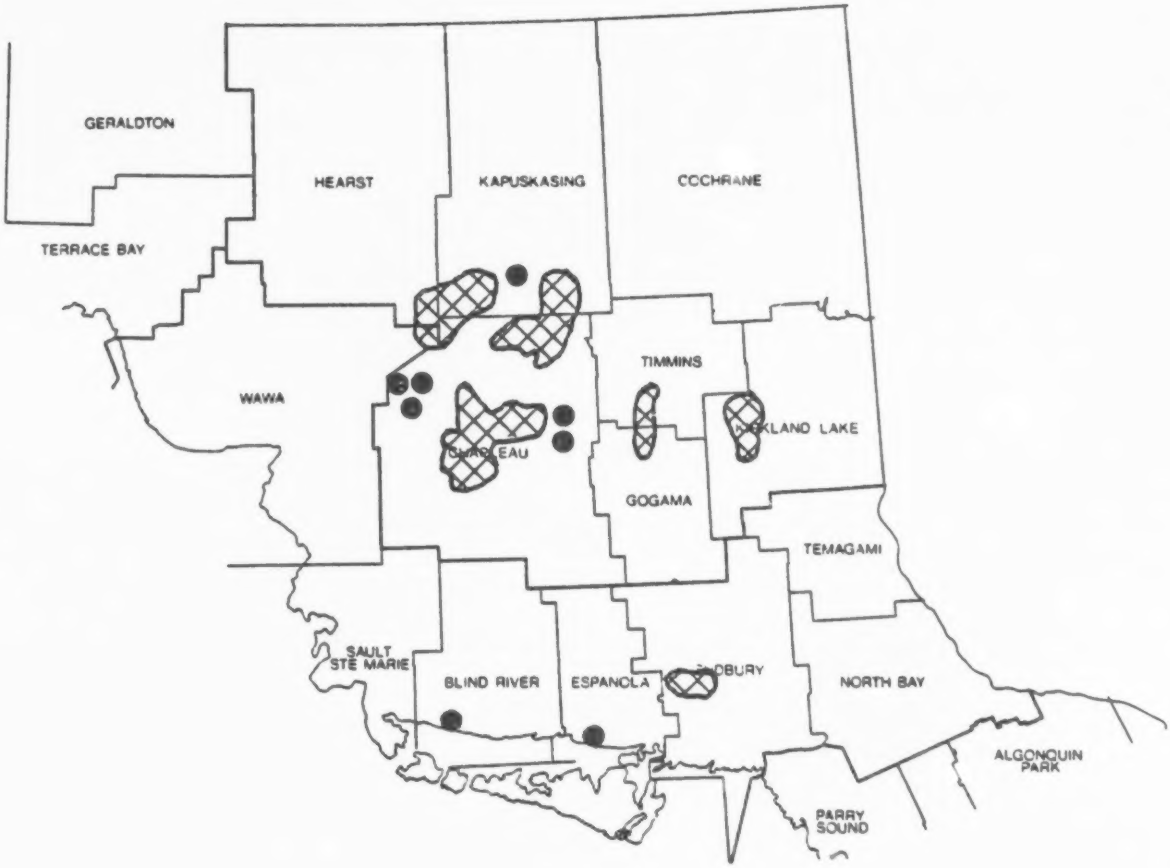
Spruce Budworm

Areas within which defoliation occurred in 1956

LEGEND

Light defoliation ▨

NORTHEASTERN ONTARIO



Spruce Budworm

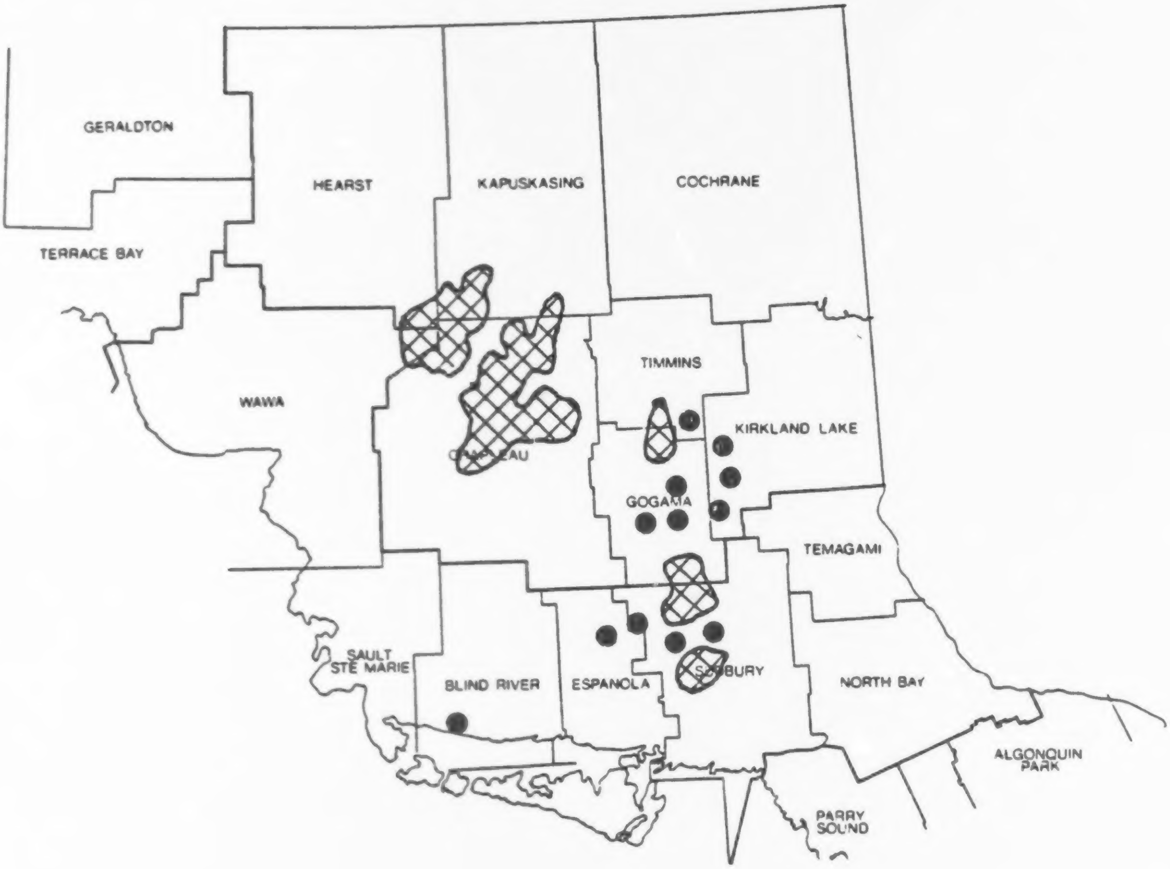
0 Miles 60
0 Kilometres 96

Areas within which defoliation
occurred in 1968

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



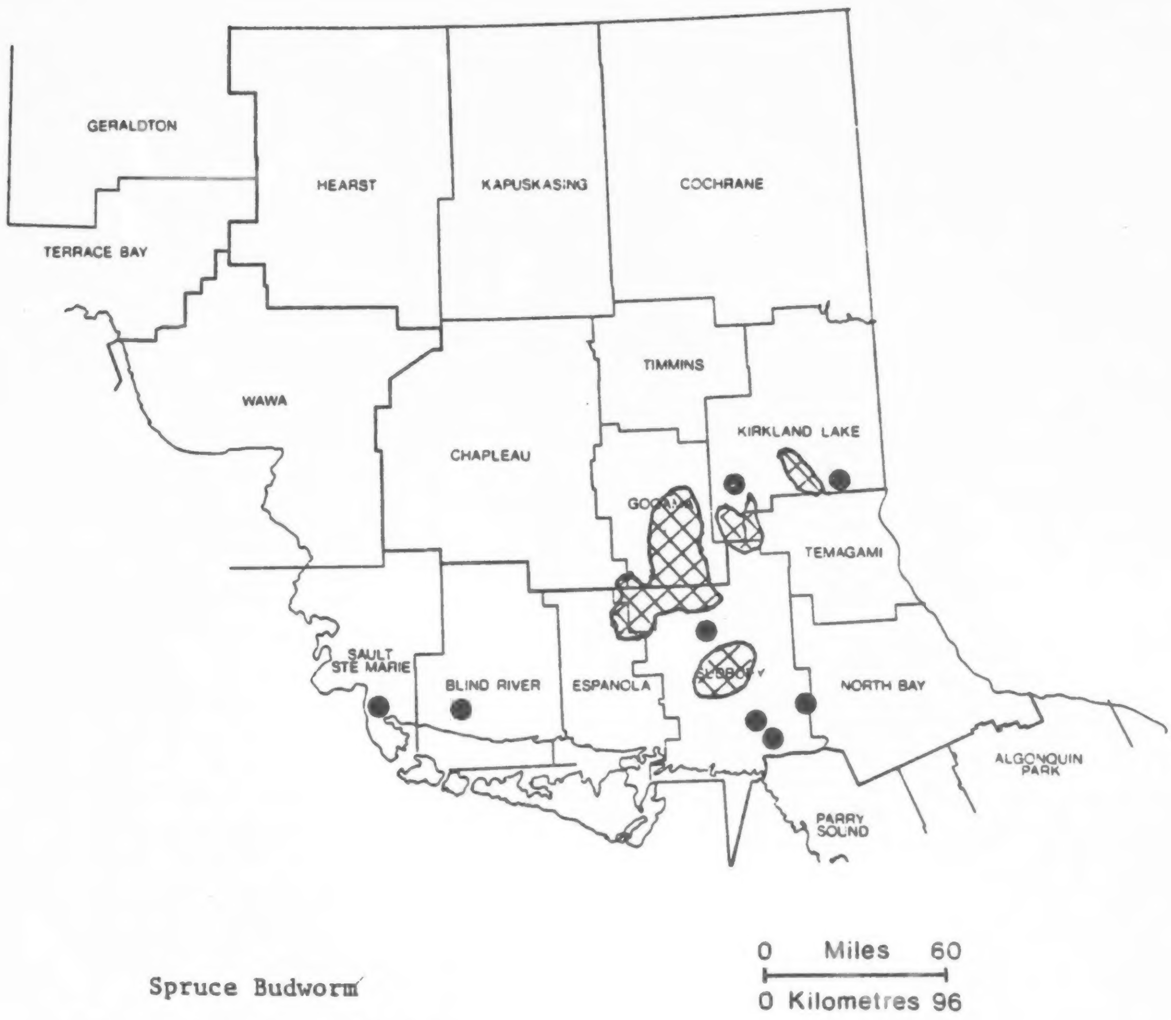
Spruce Budworm

Areas within which defoliation occurred in 1969

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



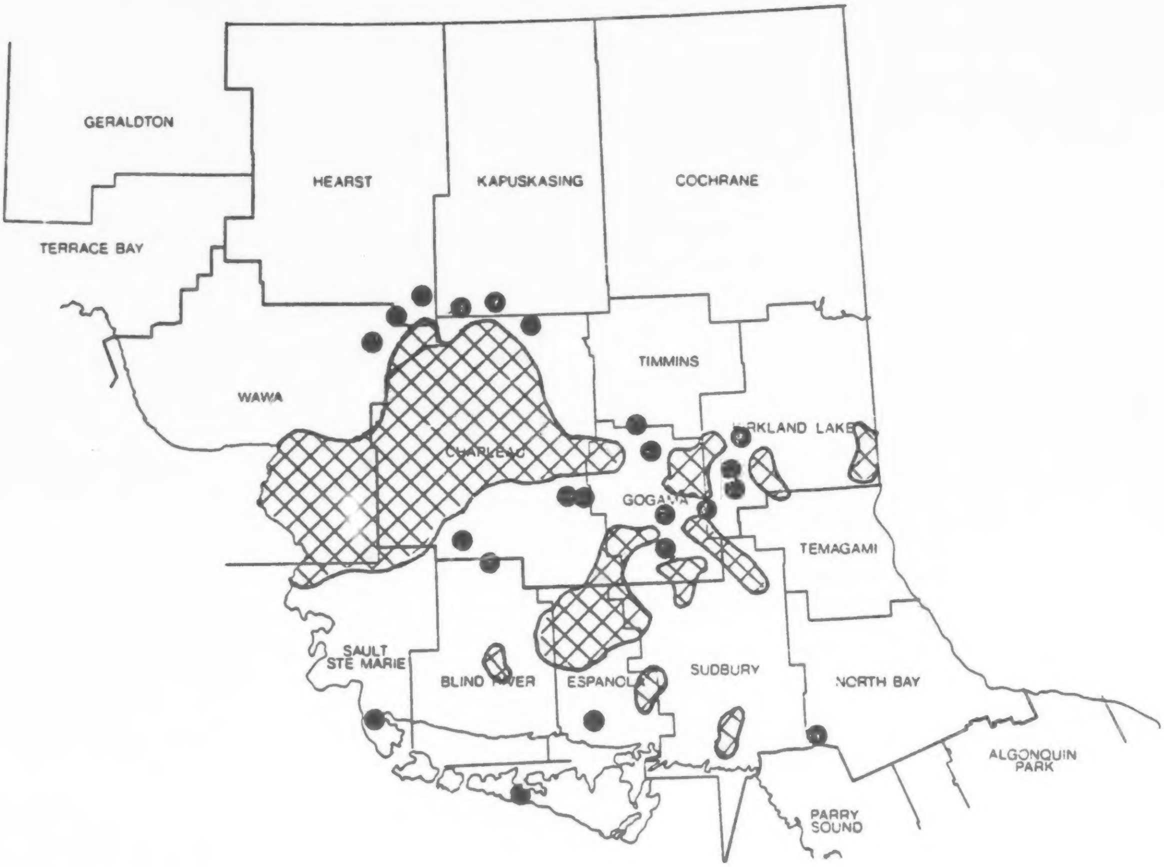
Spruce Budworm

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



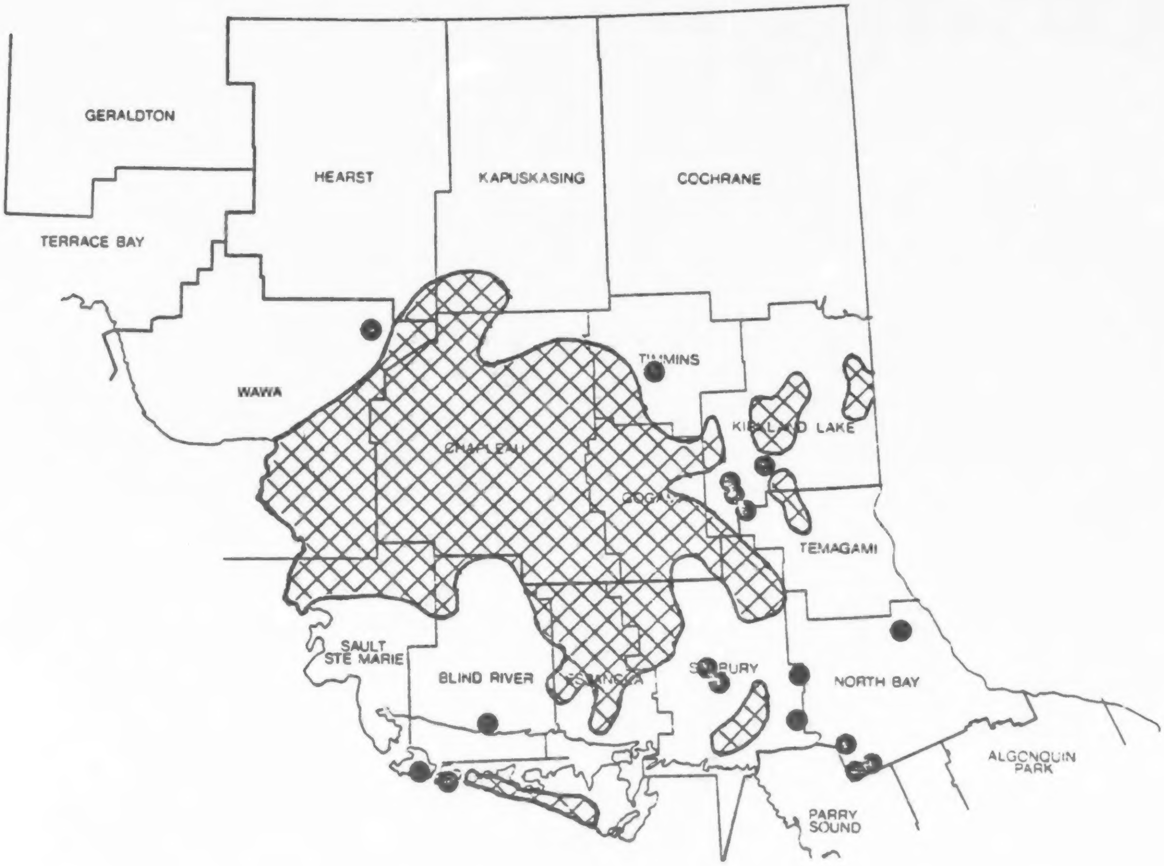
Spruce Budworm

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



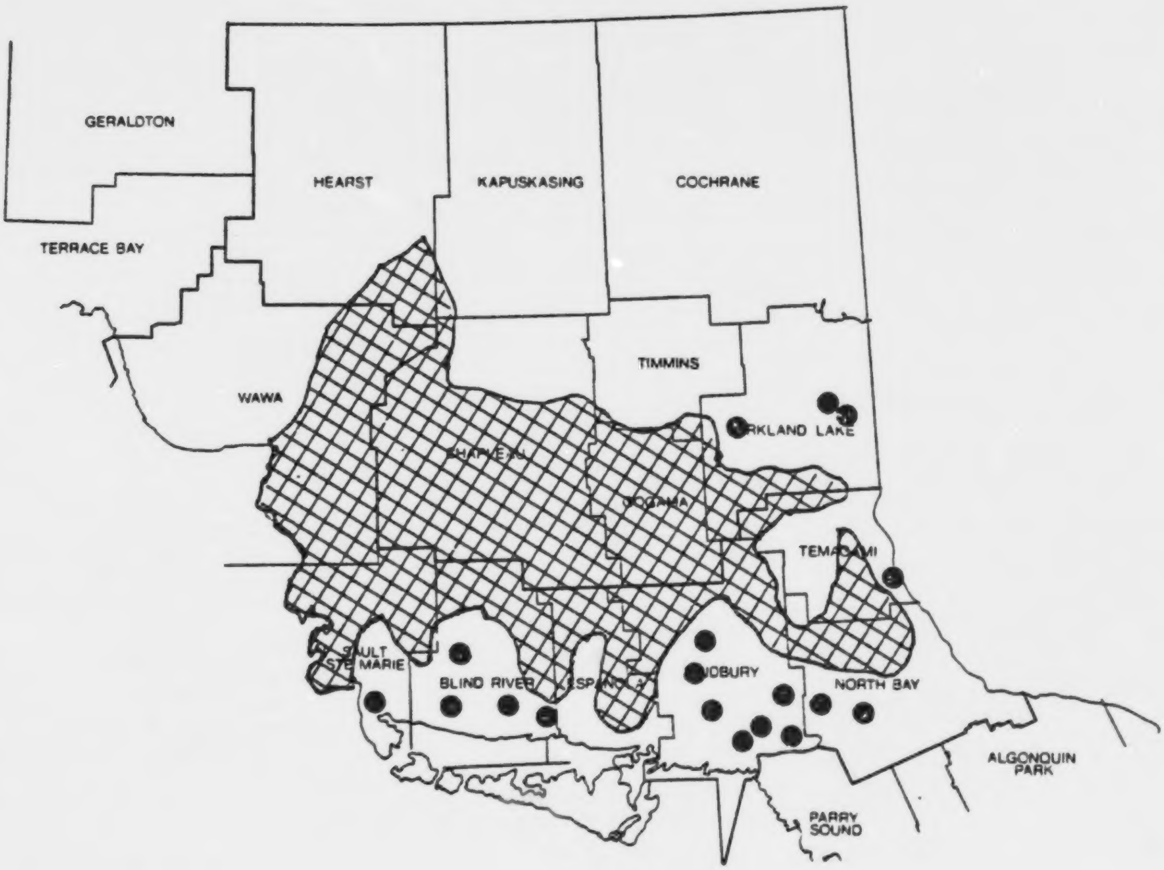
Spruce Budworm

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

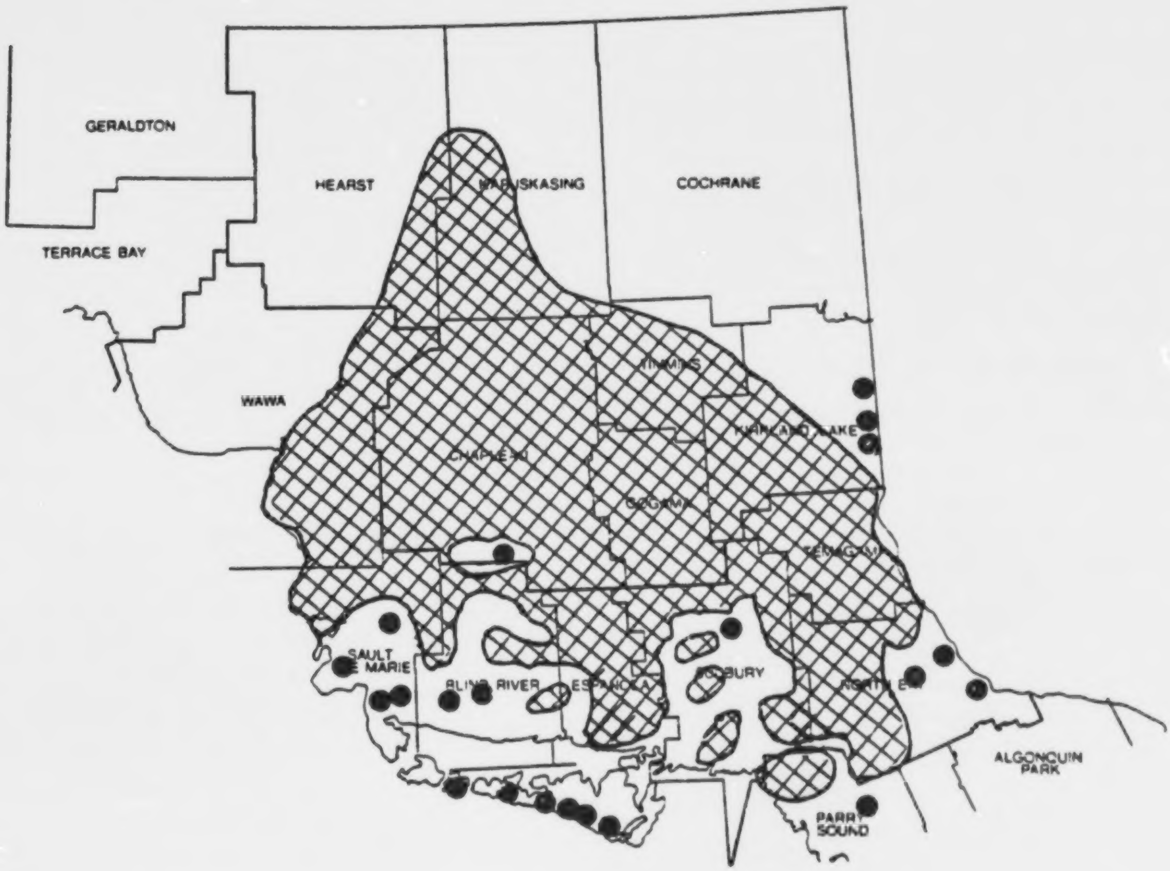
Spruce Budworm

Areas within which defoliation
occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



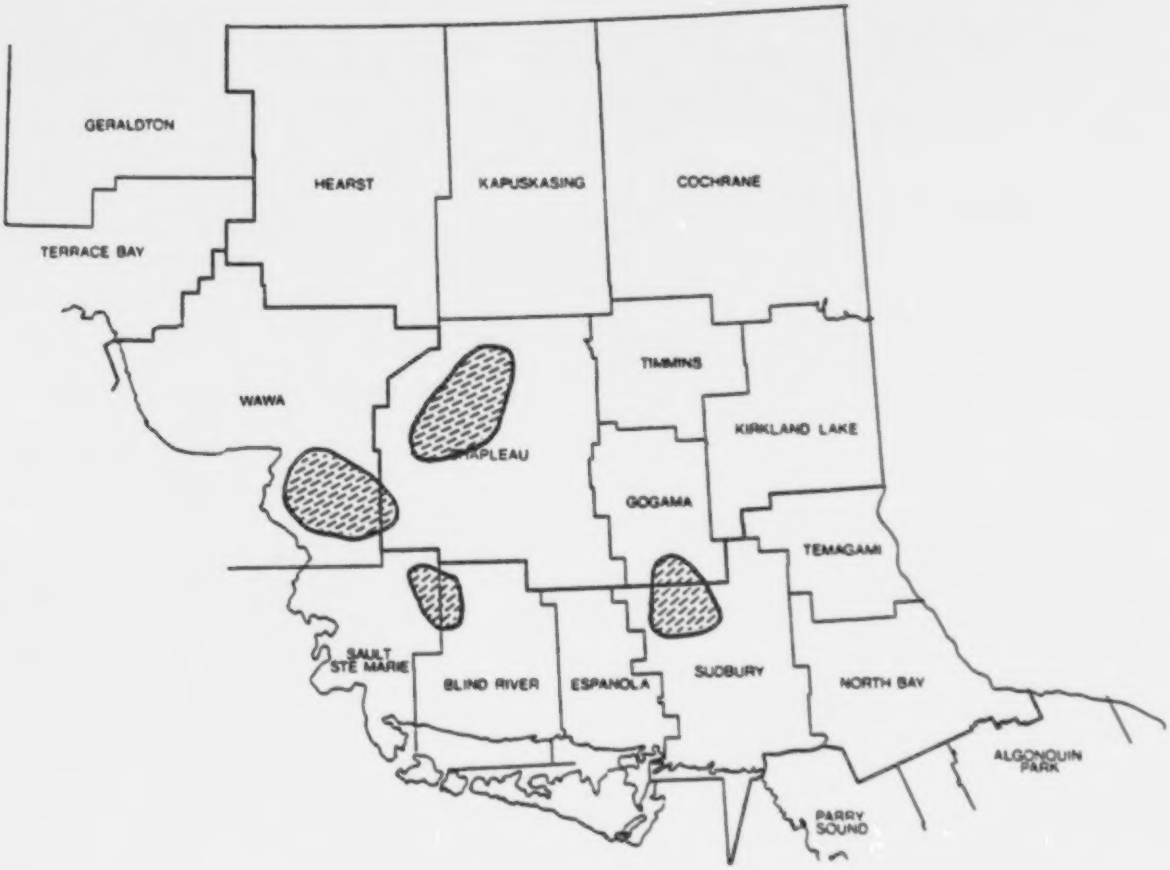
Spruce Budworm

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1974

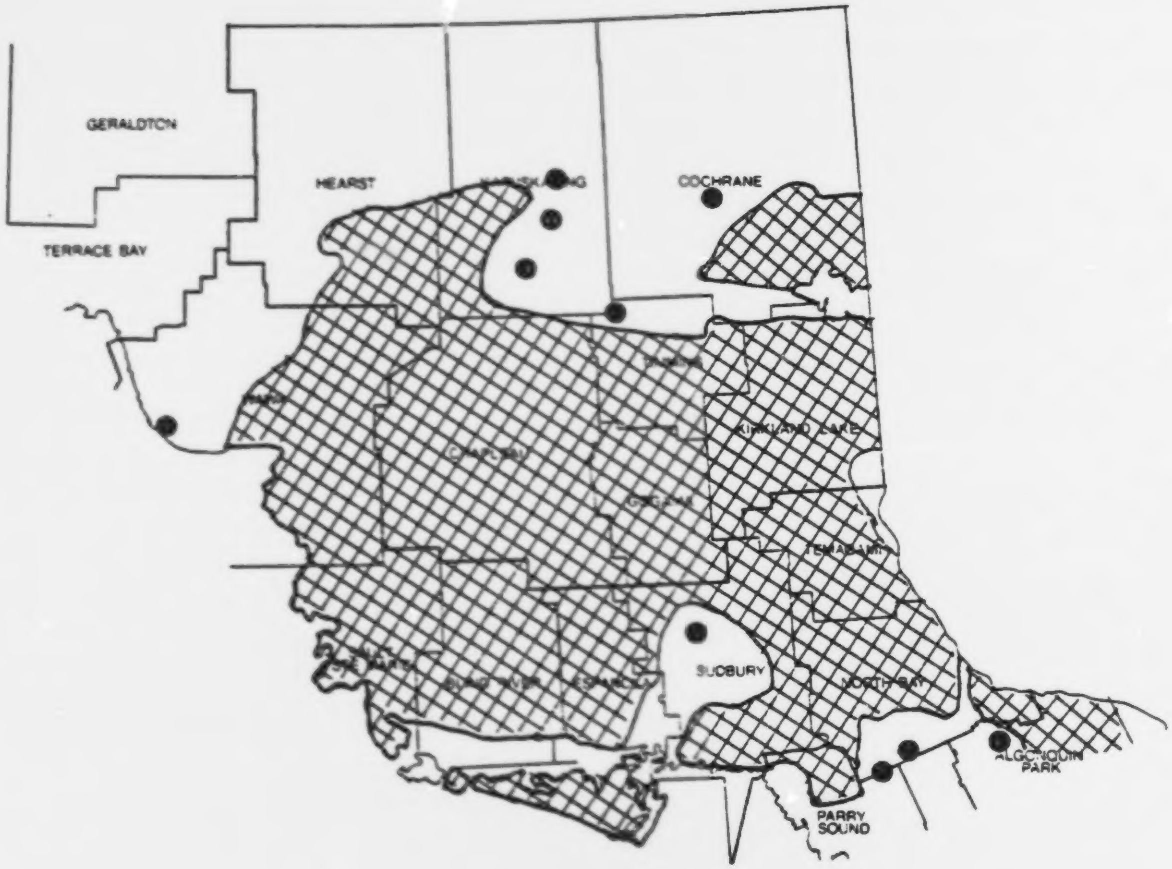
0 Miles 60

0 Kilometres 96

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO



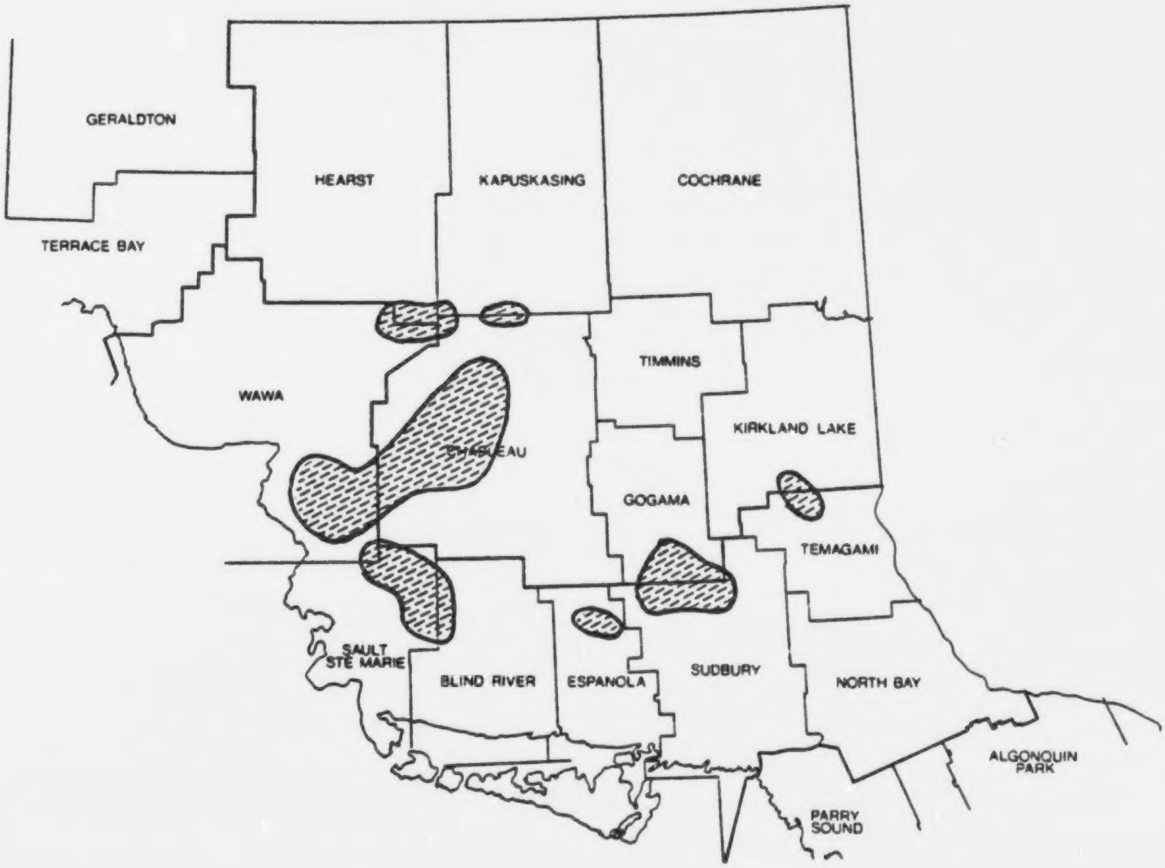
Spruce Budworm

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

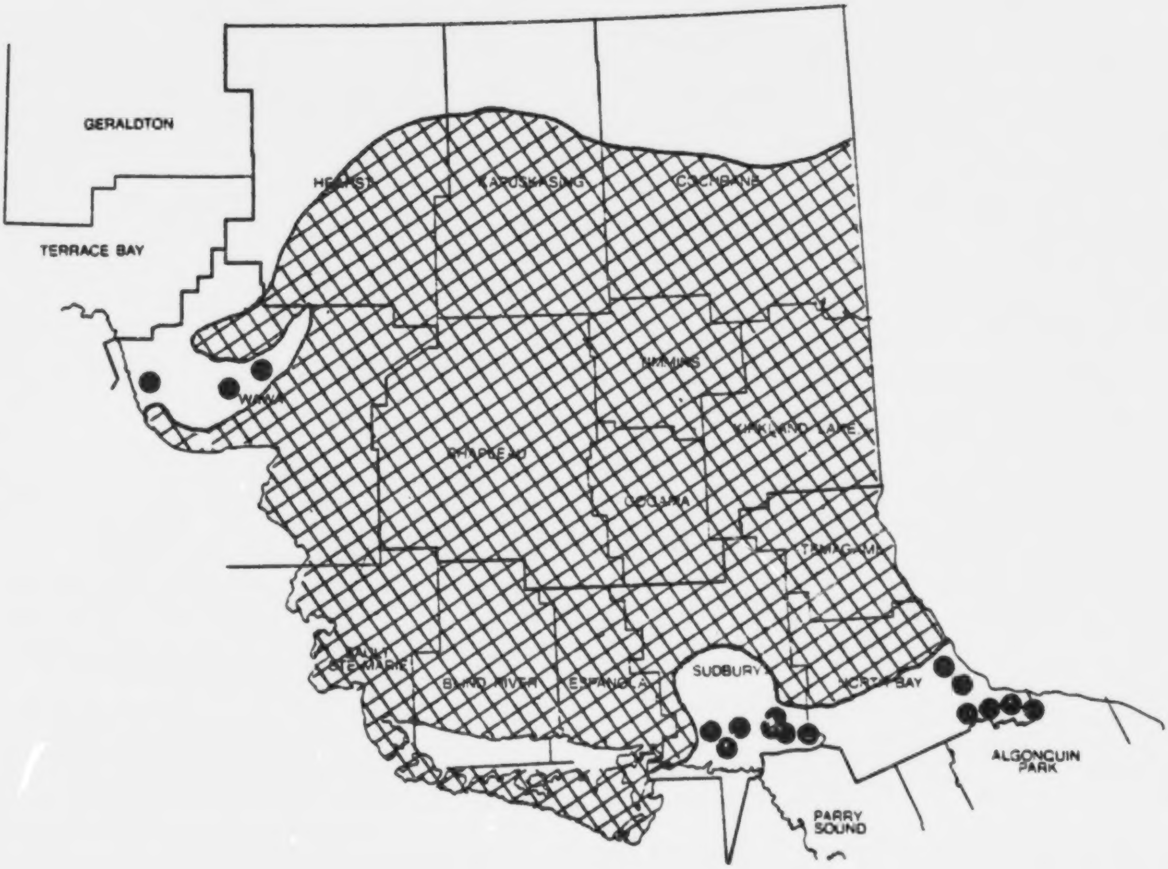
Areas within which balsam fir
whole tree and top mortality
occurred in 1975

0 Miles 60
0 Kilometres 96

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

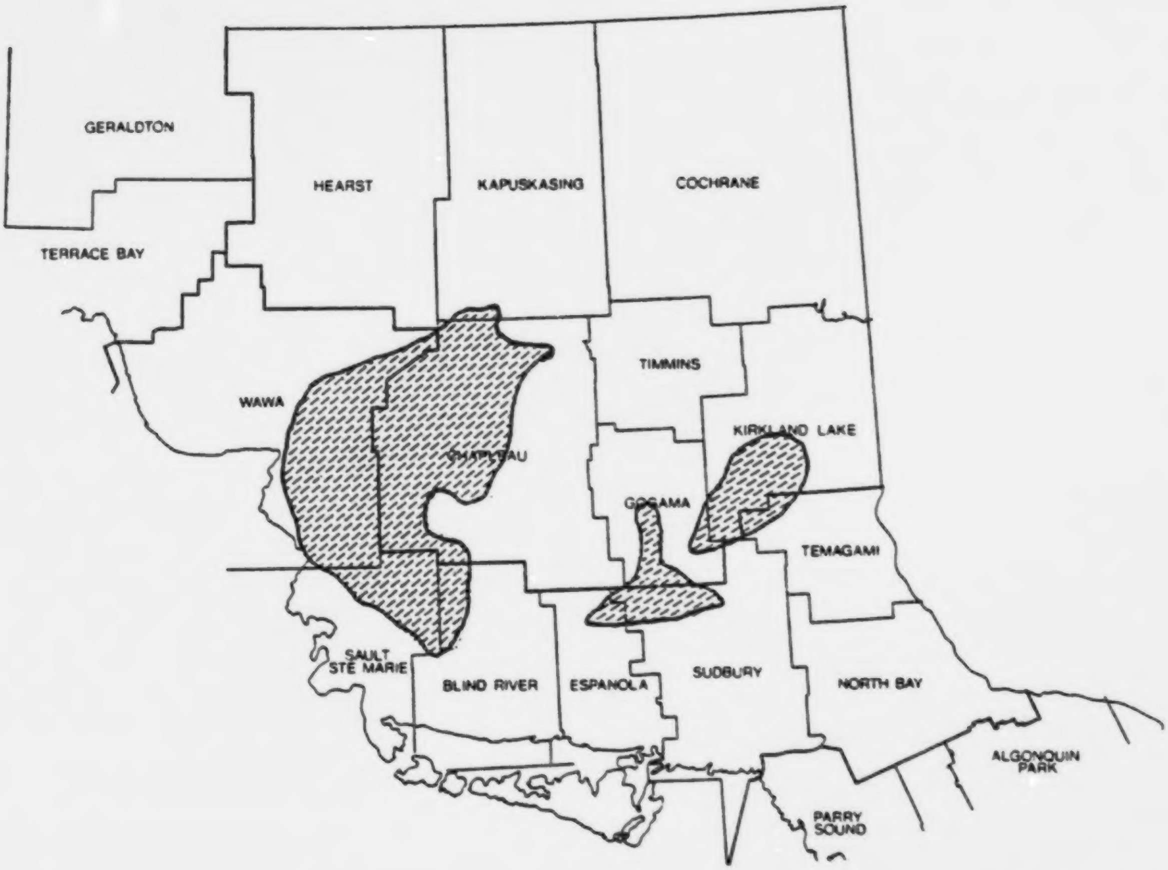
Spruce Budworm

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



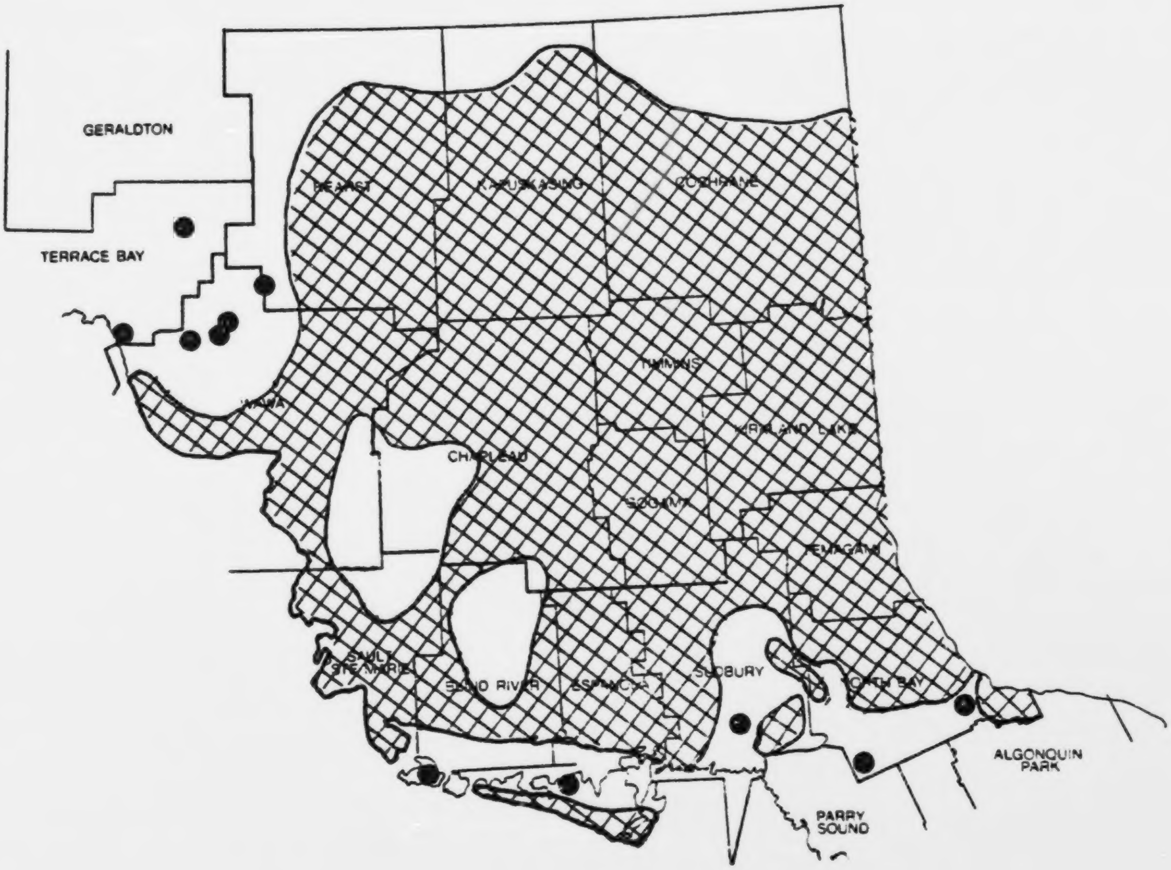
Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1976

LEGEND

Mortality	▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

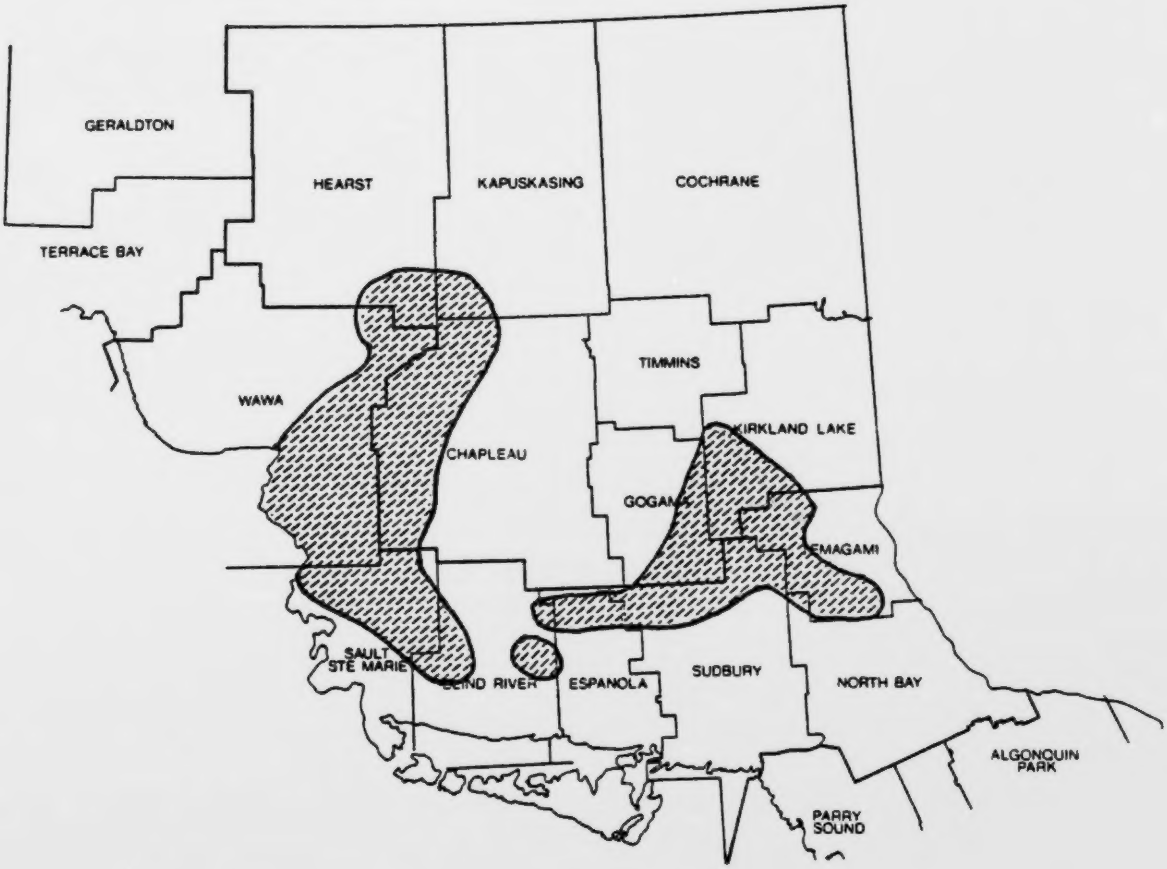
Spruce Budworm

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

0 Miles 60

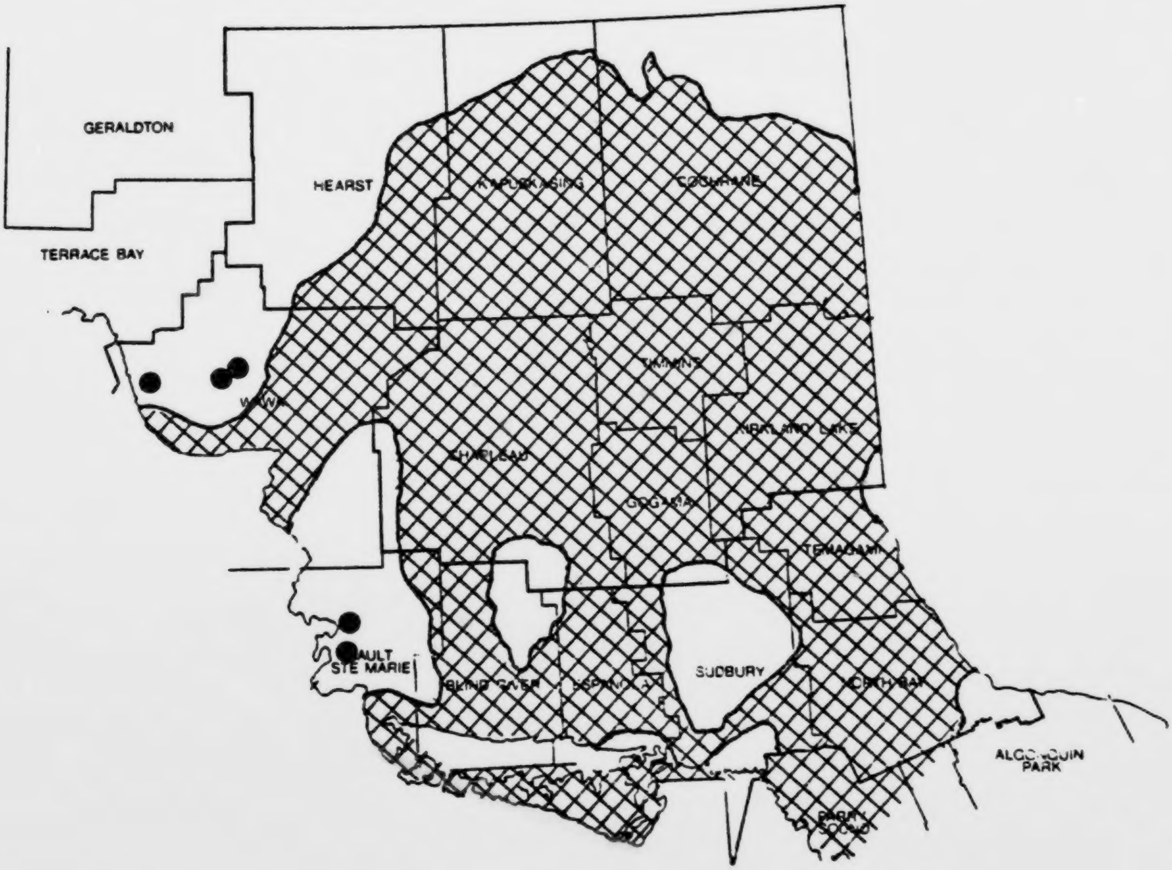
0 Kilometres 96

Areas within which balsam fir whole tree and top mortality occurred in 1977

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

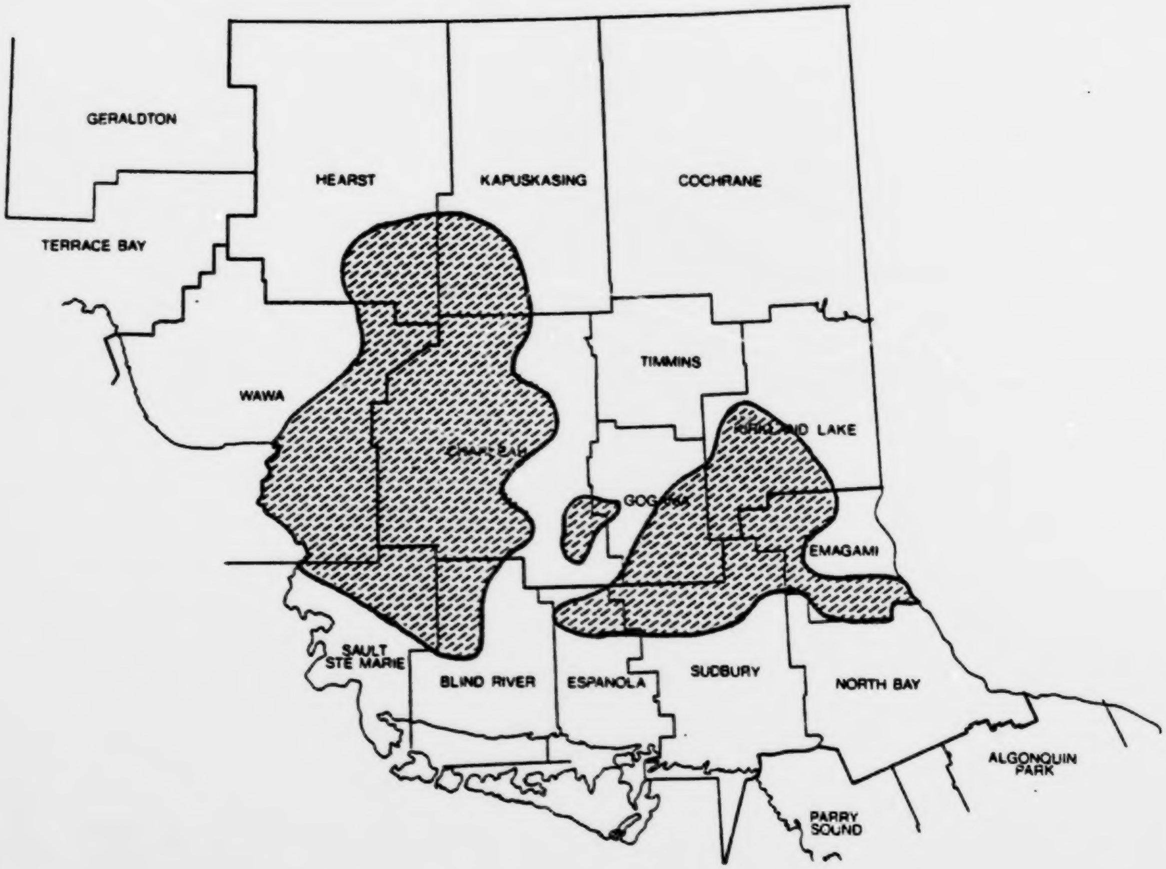
Spruce Budworm

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

0 Miles 60

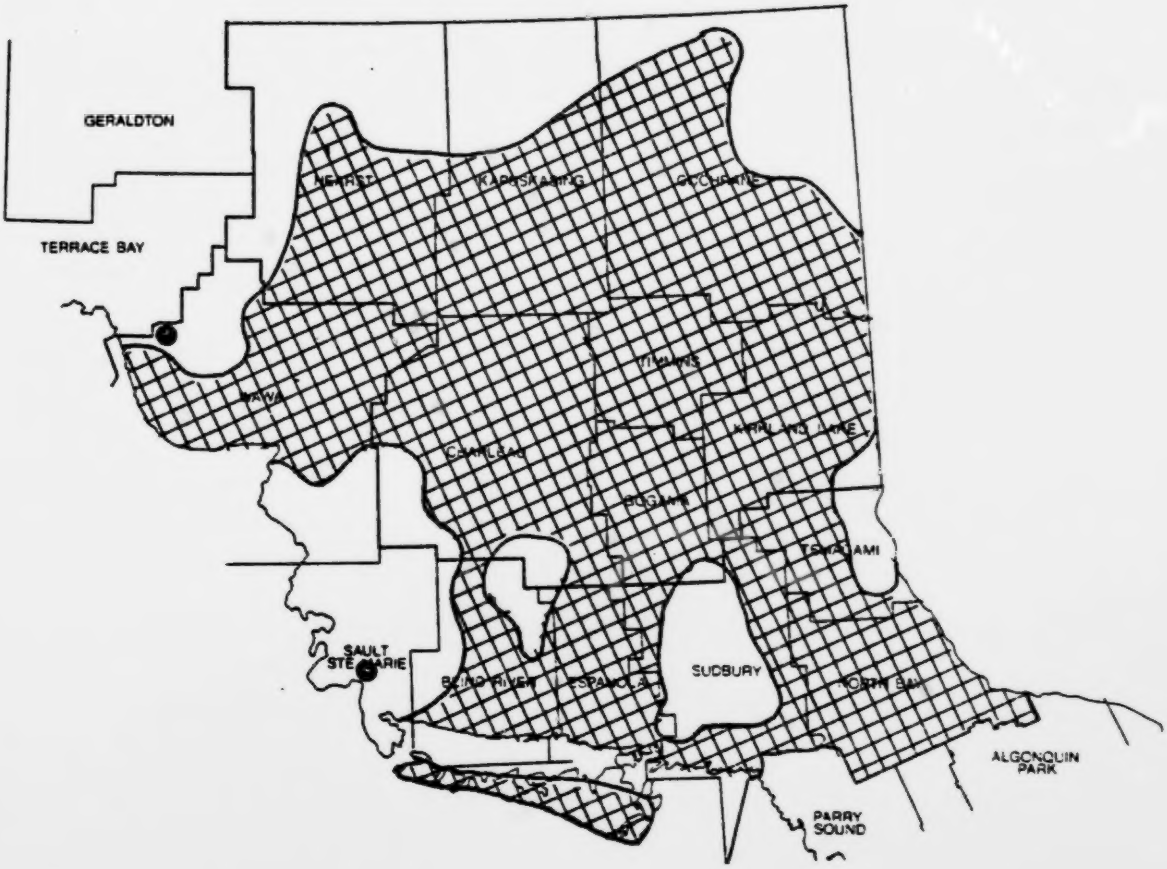
0 Kilometres 96

Areas within which balsam fir whole tree and top mortality occurred in 1978

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO



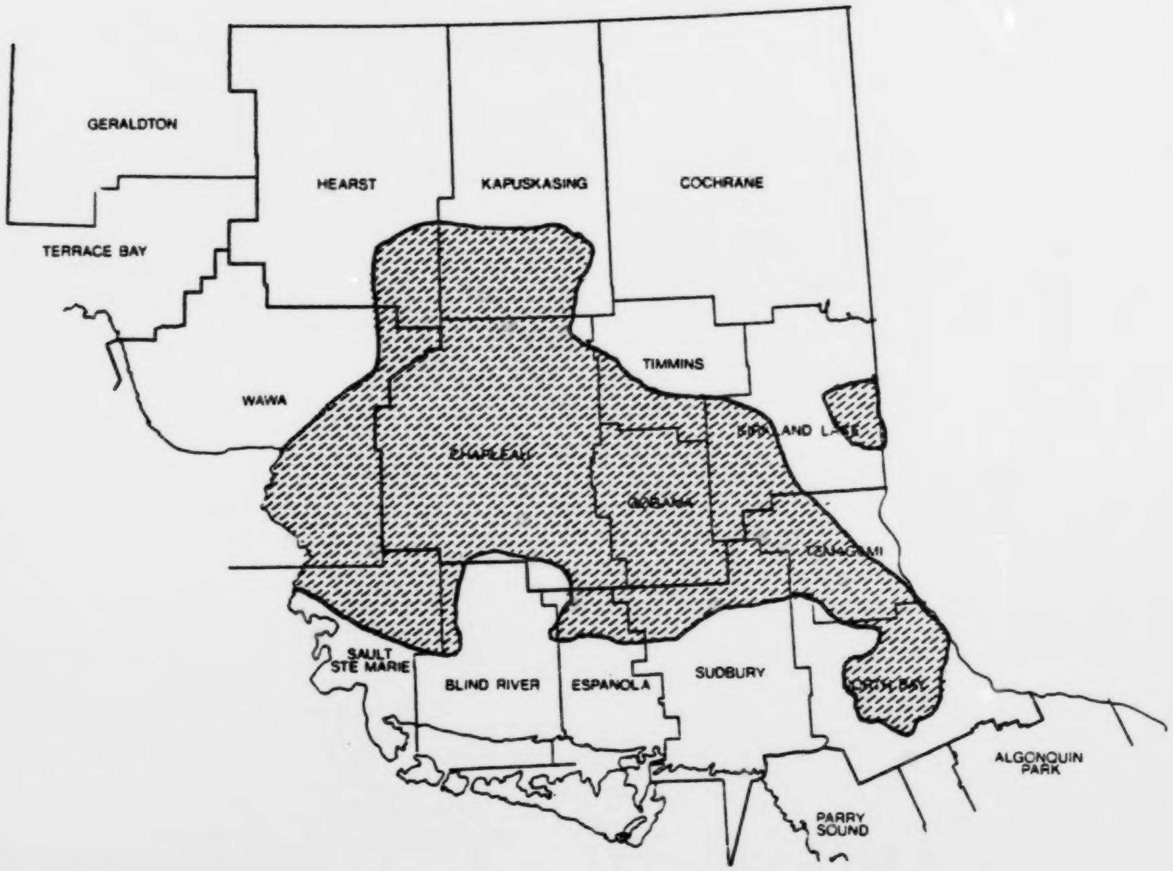
Spruce Budworm

Areas within which defoliation
occurred in 1979

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



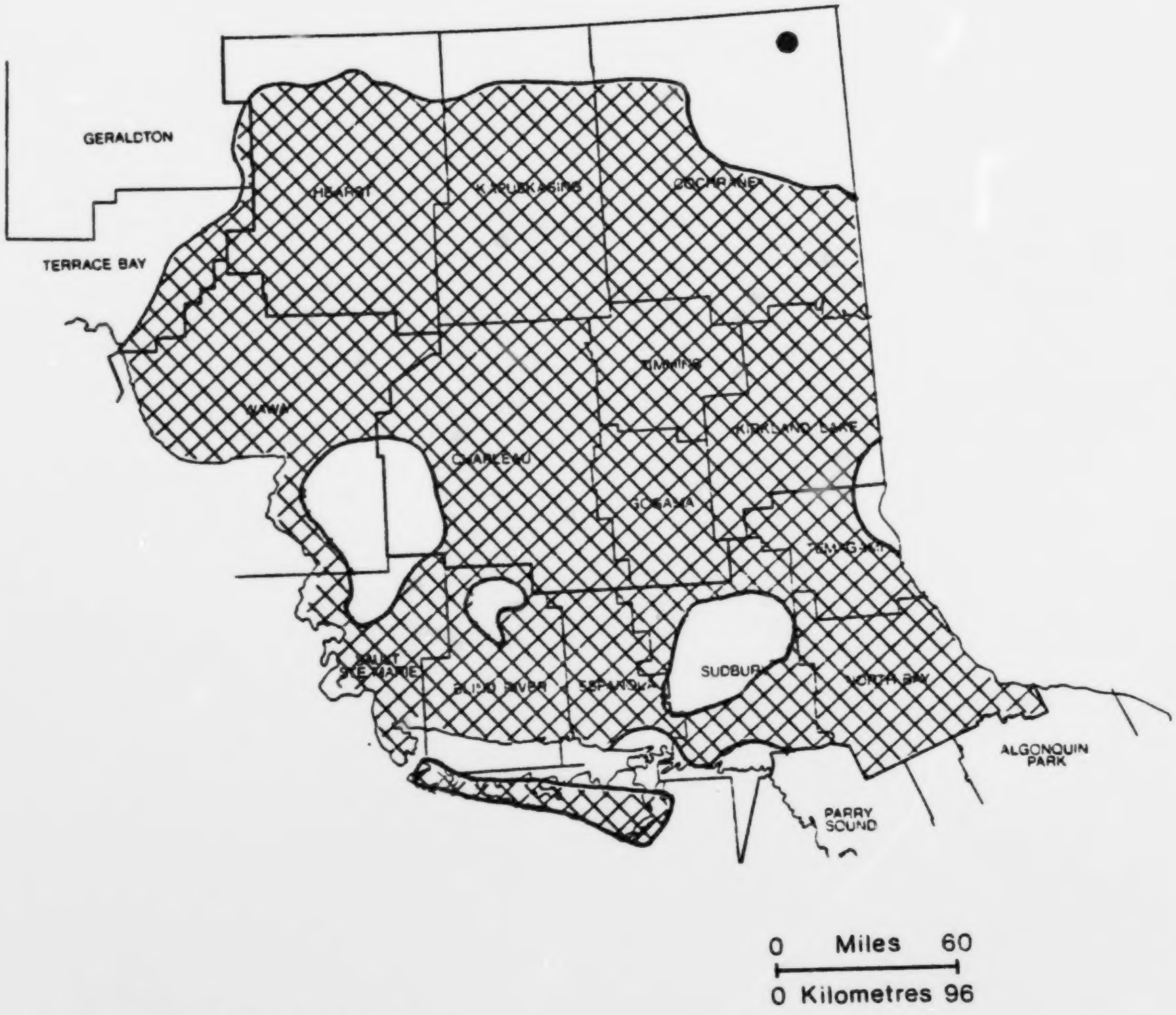
Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1979

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO



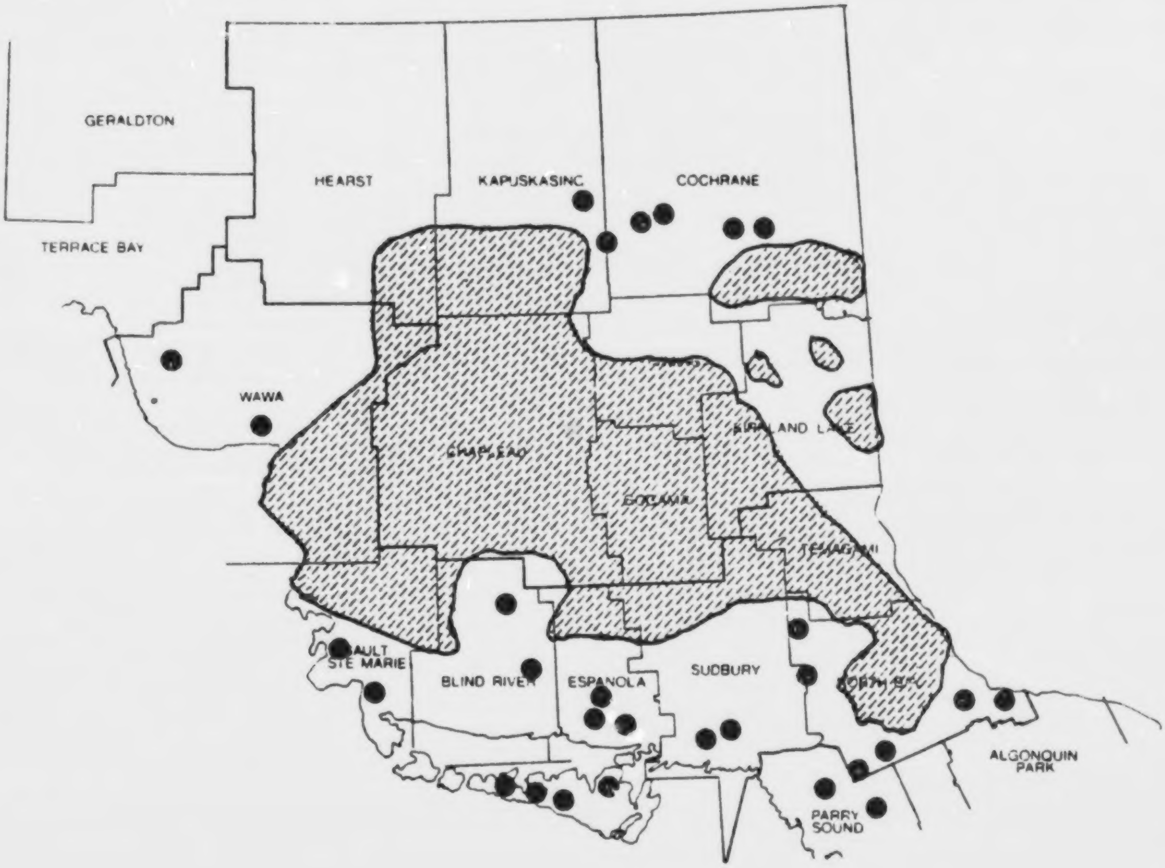
Spruce Budworm

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

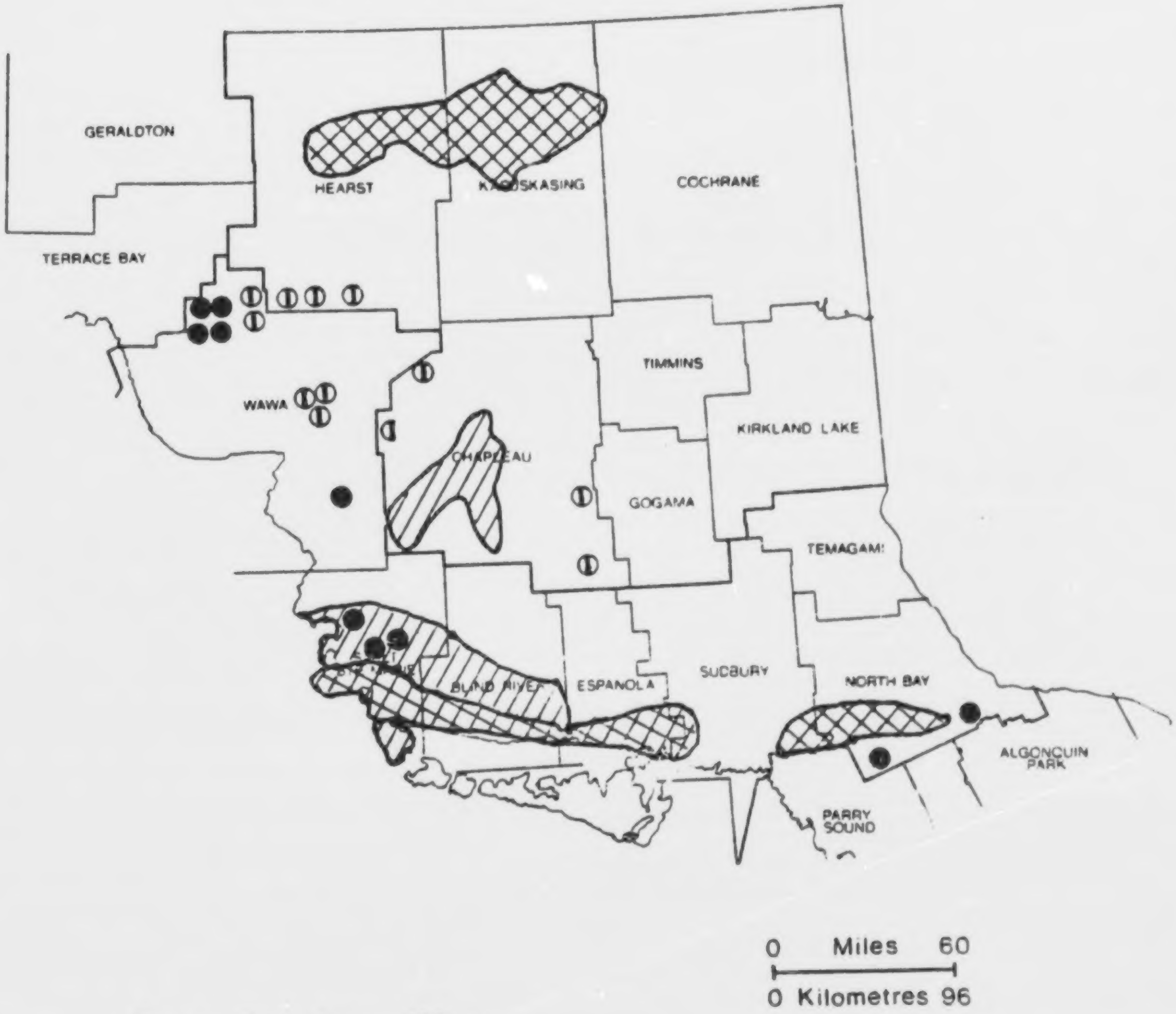
Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1980

LEGEND

Mortality ▨ or ●

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

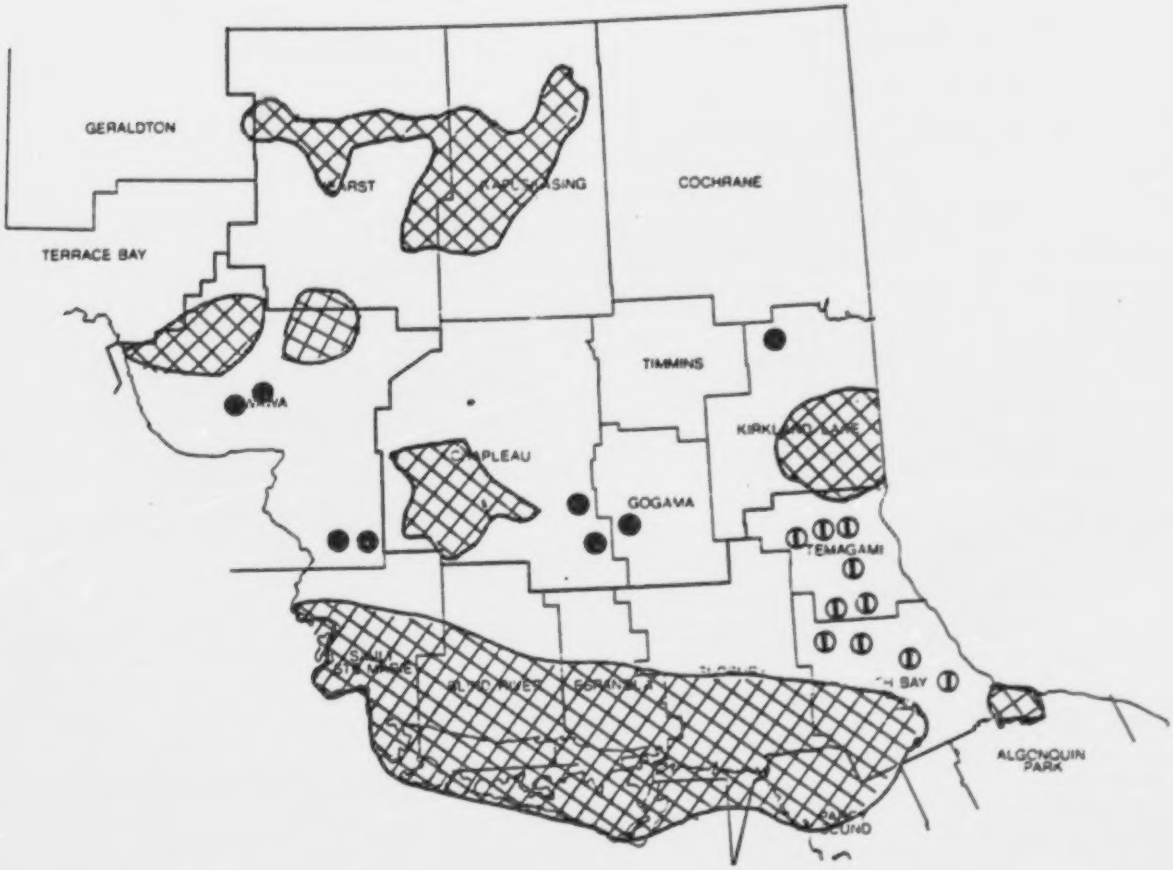
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▦

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

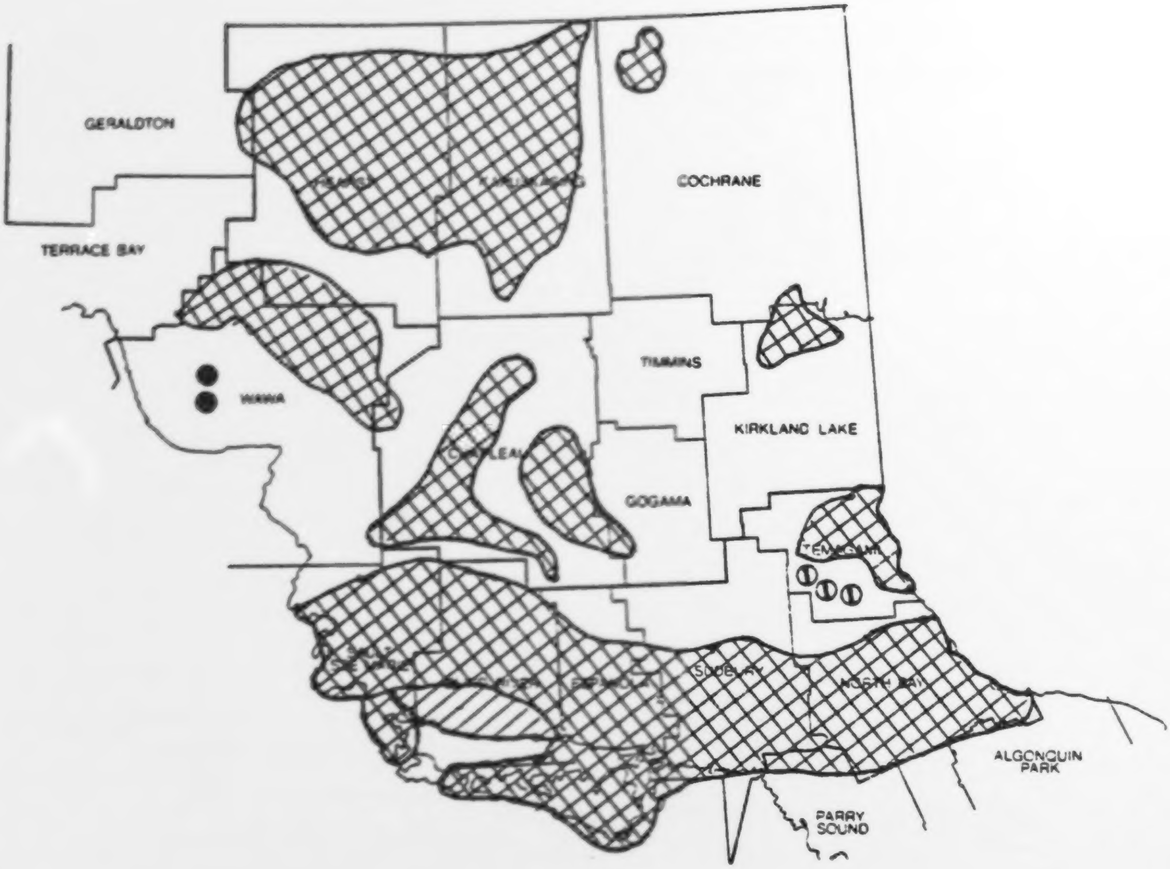
Areas within which defoliation occurred in 1951

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

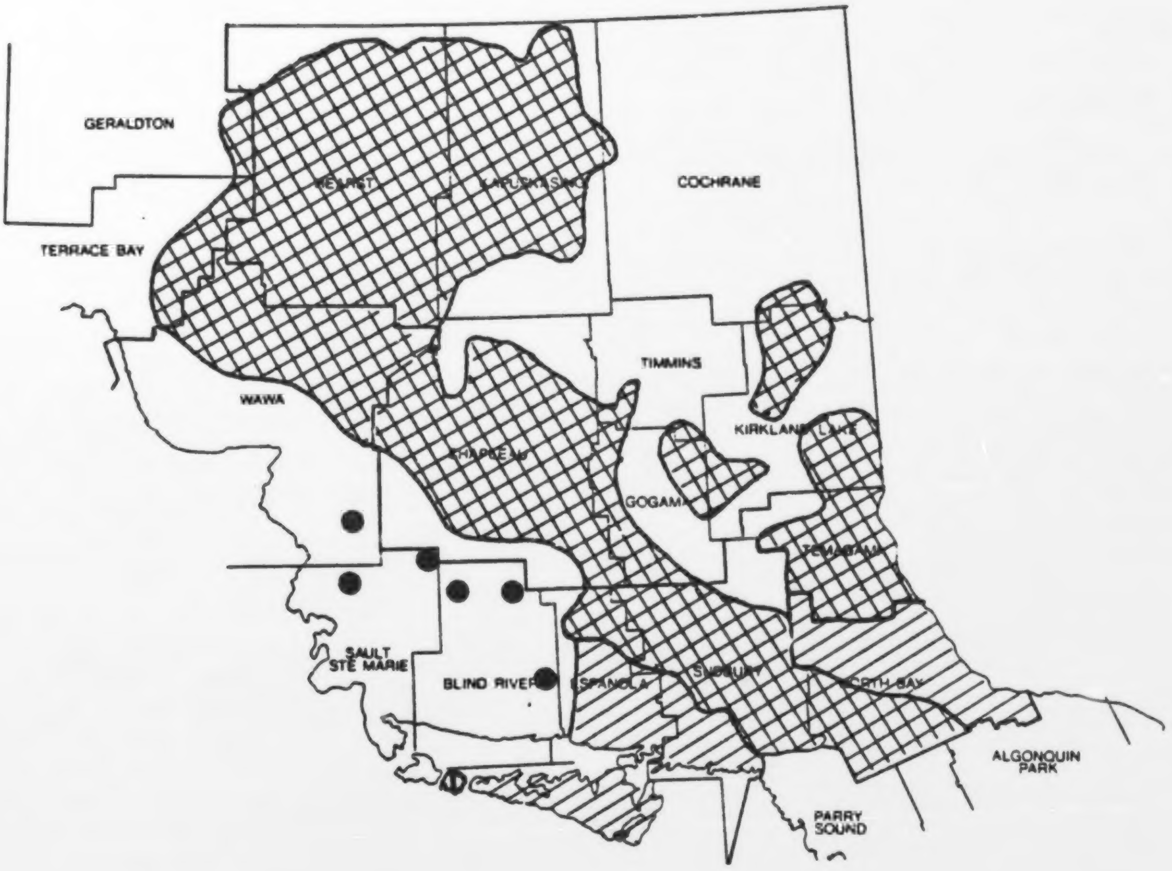
Areas within which defoliation occurred in 1952

LEGEND

Light defoliation ◑ or ▨

Moderate-to-severe defoliation ● or ▦

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

0 Miles 60

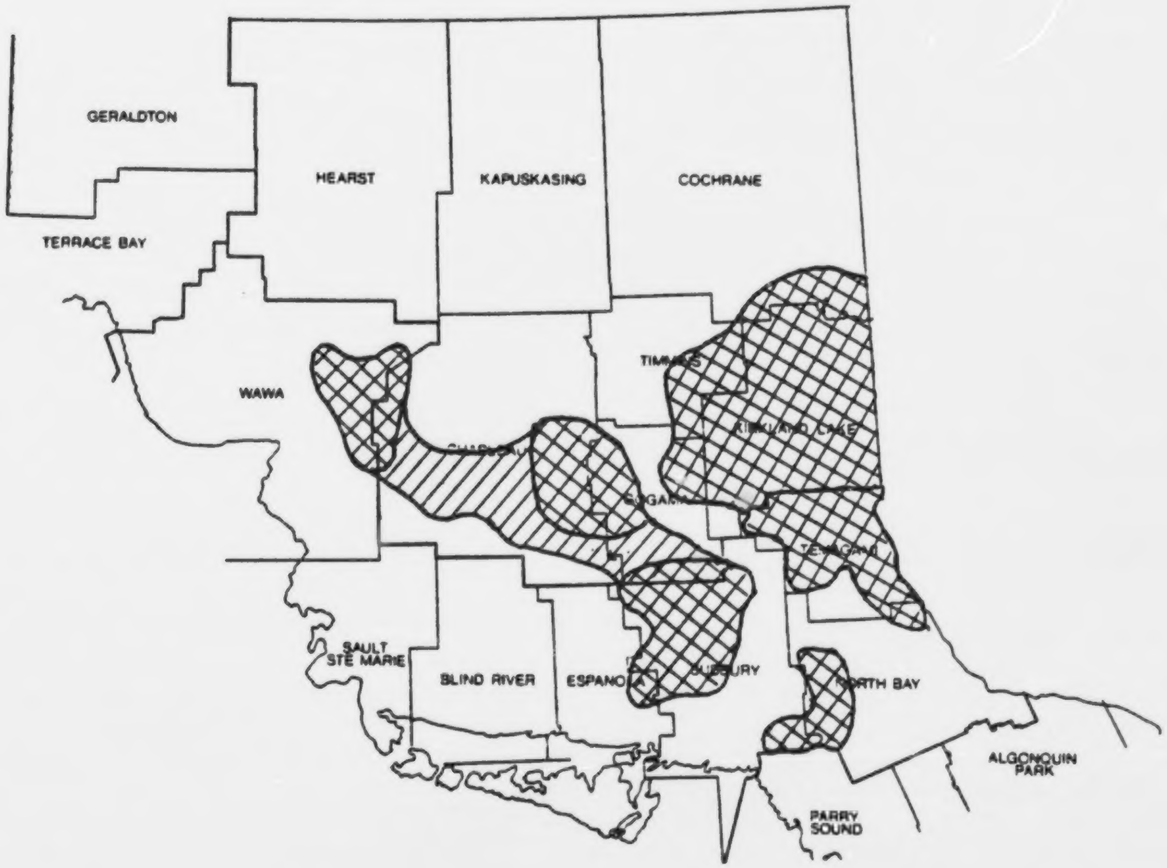
0 Kilometres 96

LEGEND

Light defoliation ◑ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

0 Miles 60

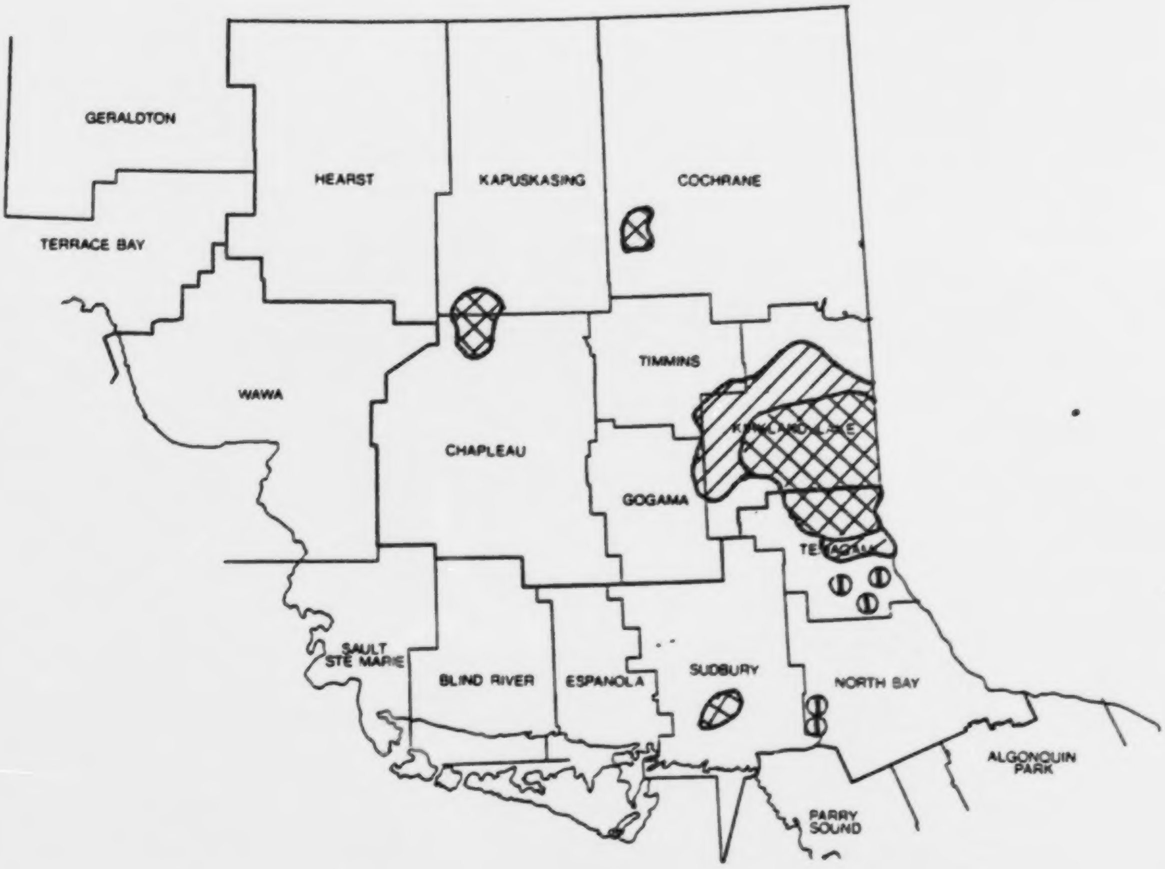
0 Kilometres 96

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▦

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

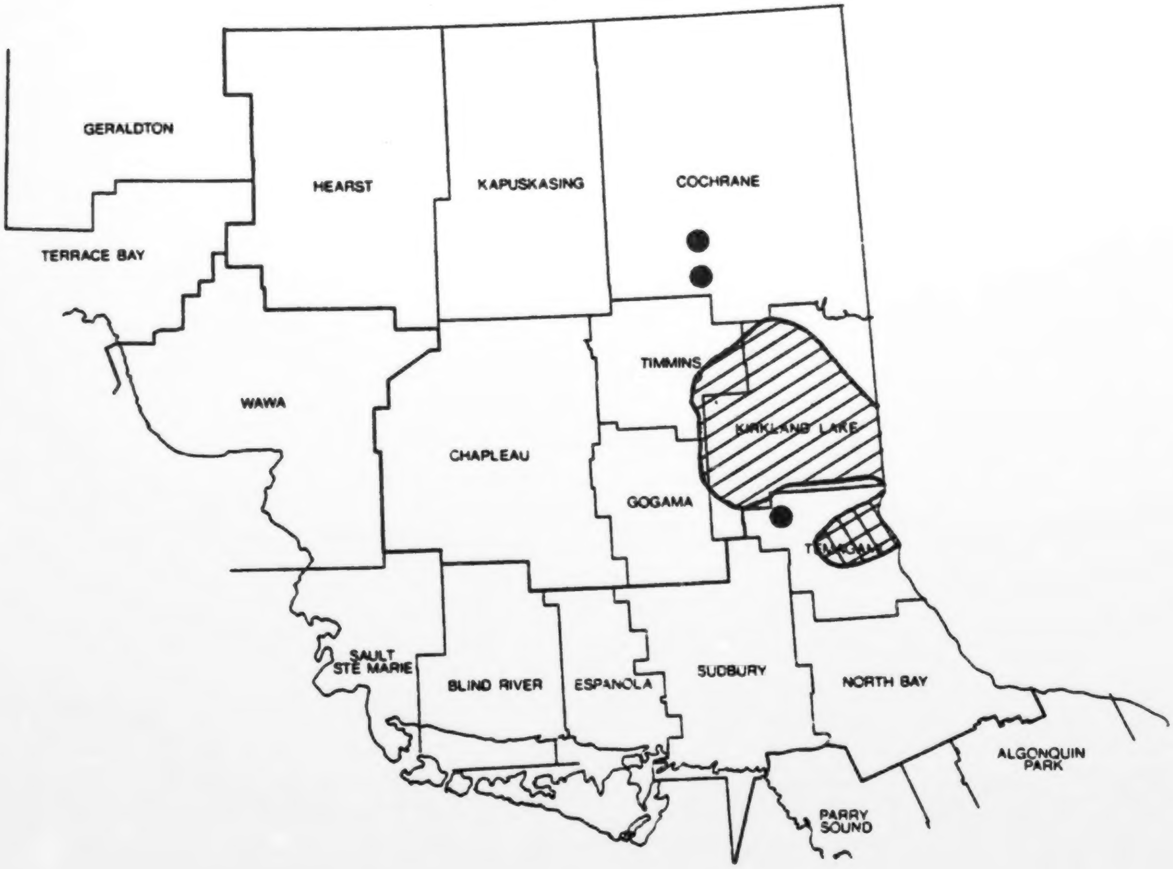
Areas within which defoliation occurred in 1955

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ▩

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

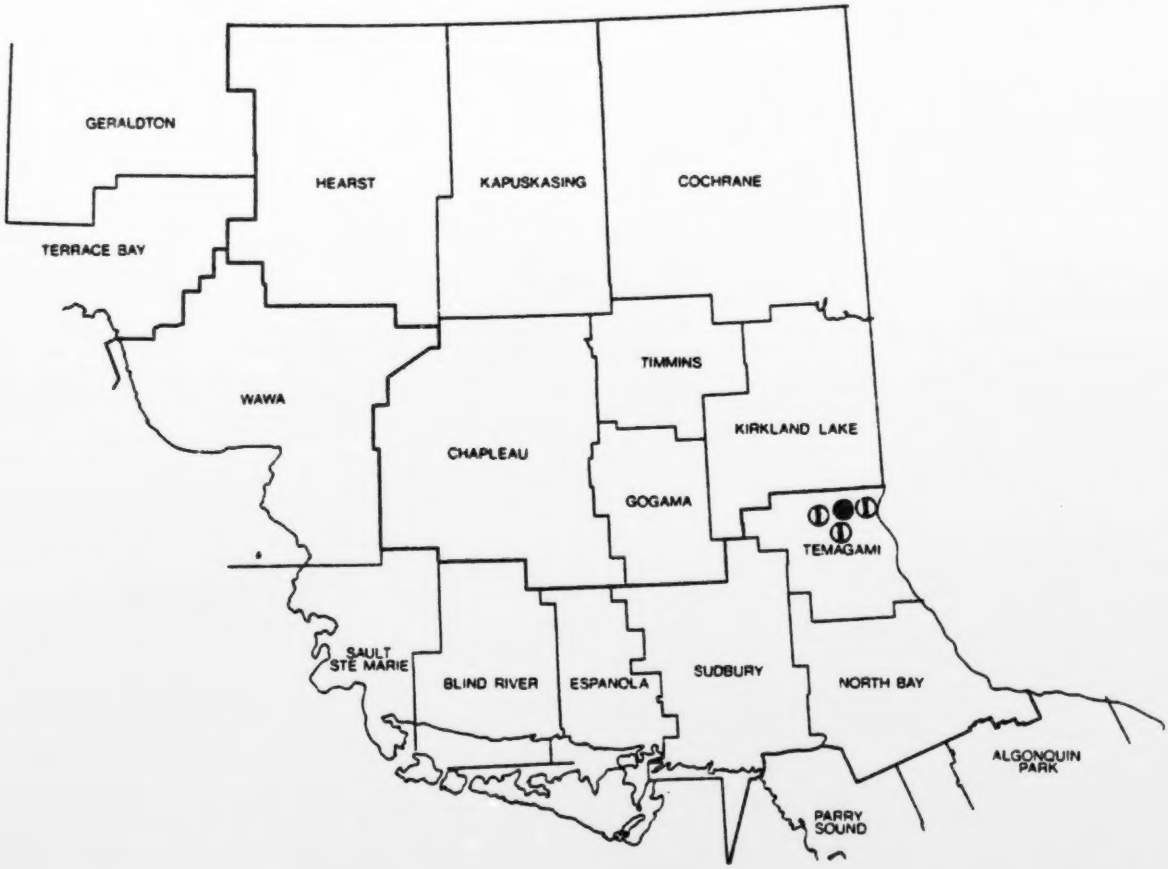
Areas within which defoliation occurred in 1956

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

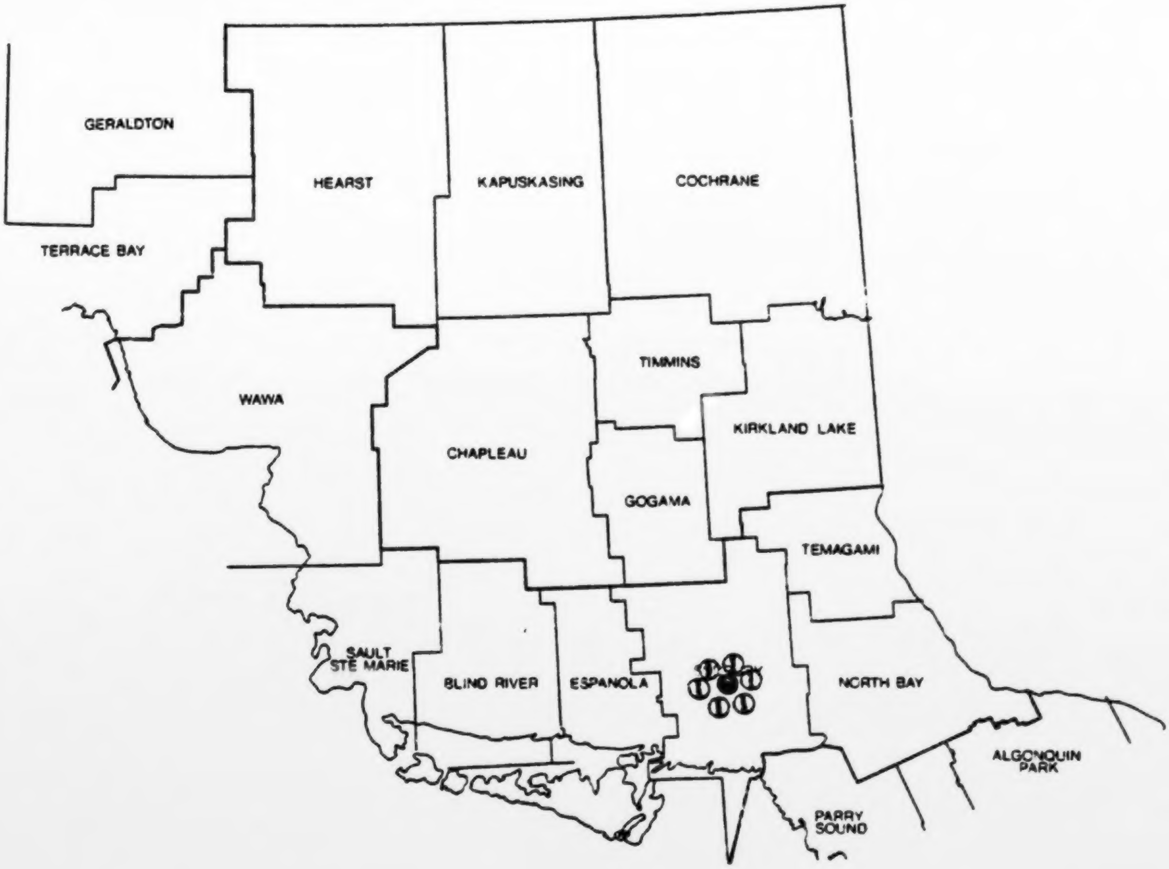
Areas within which defoliation occurred in 1957

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

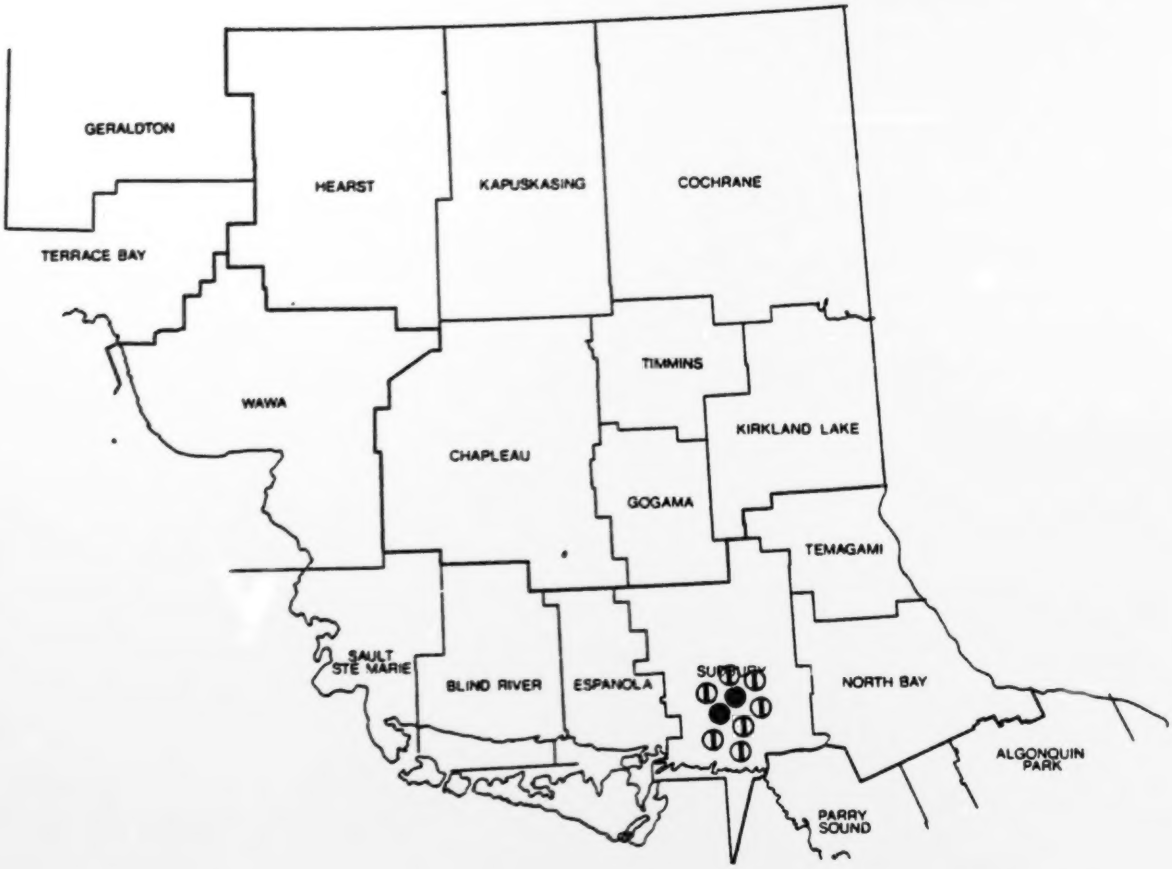
Areas within which defoliation occurred in 1960

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

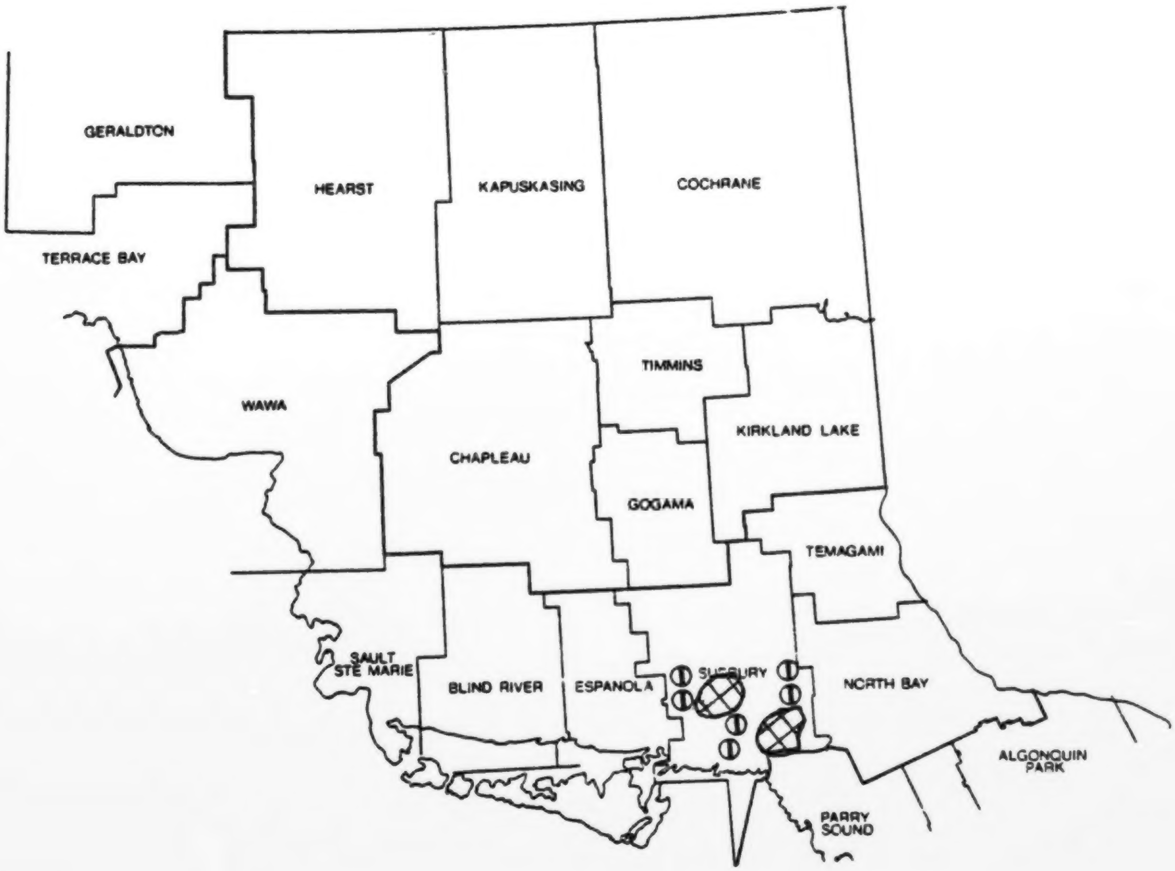
Areas within which defoliation occurred in 1961

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

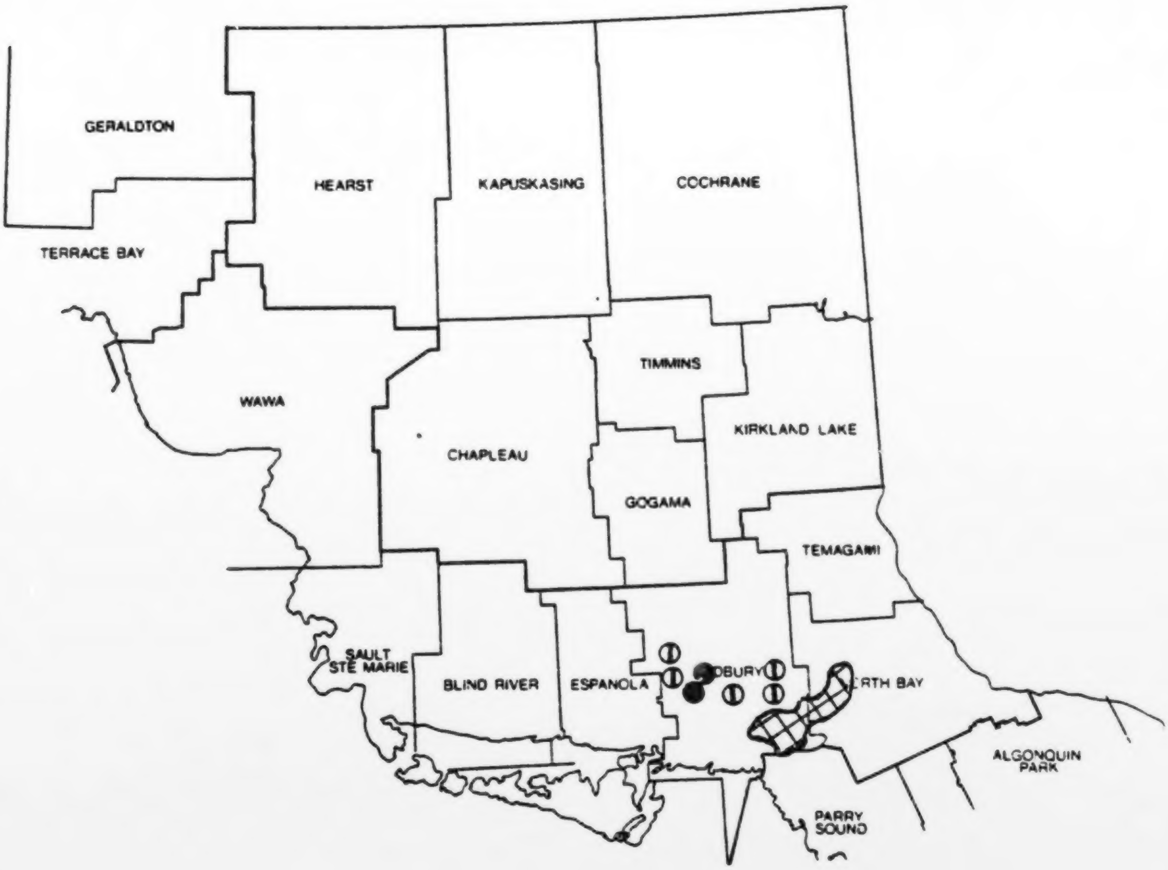
Areas within which defoliation occurred in 1962

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

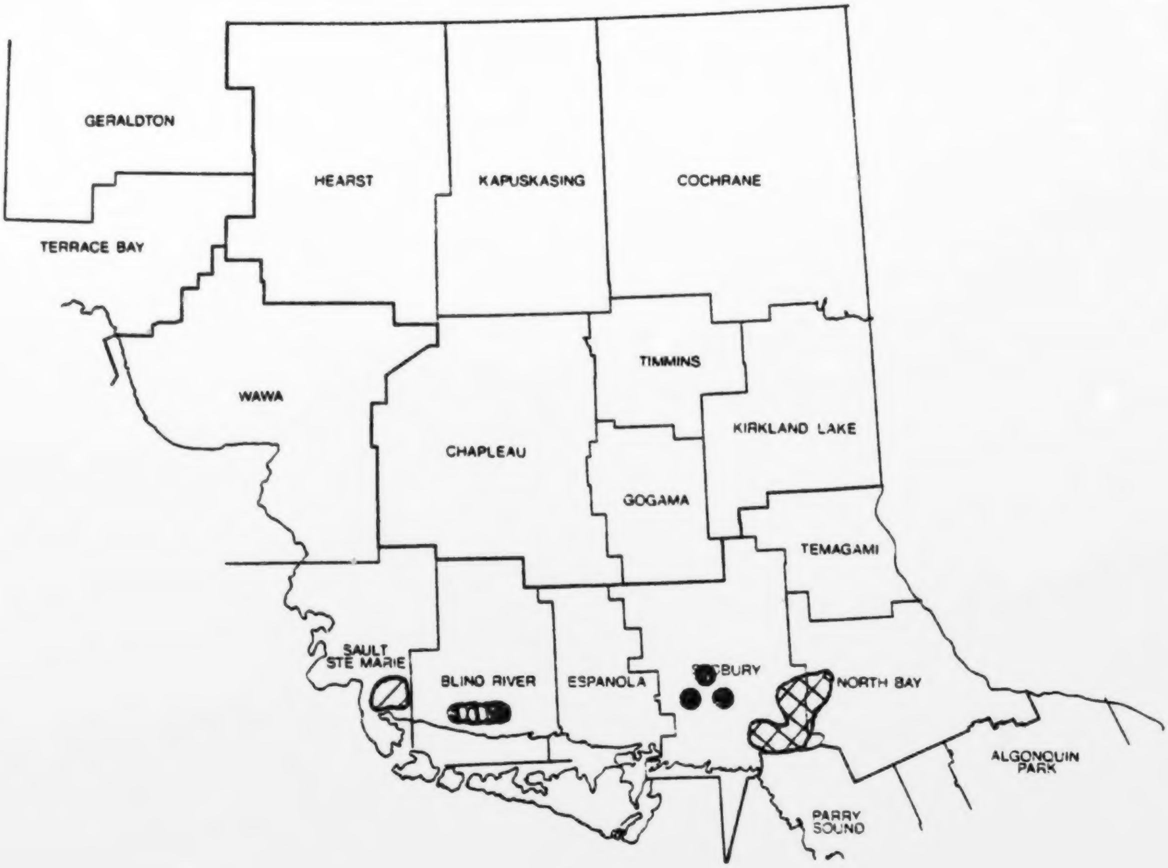
Areas within which defoliation occurred in 1963

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

0 Miles 60
0 Kilometres 96

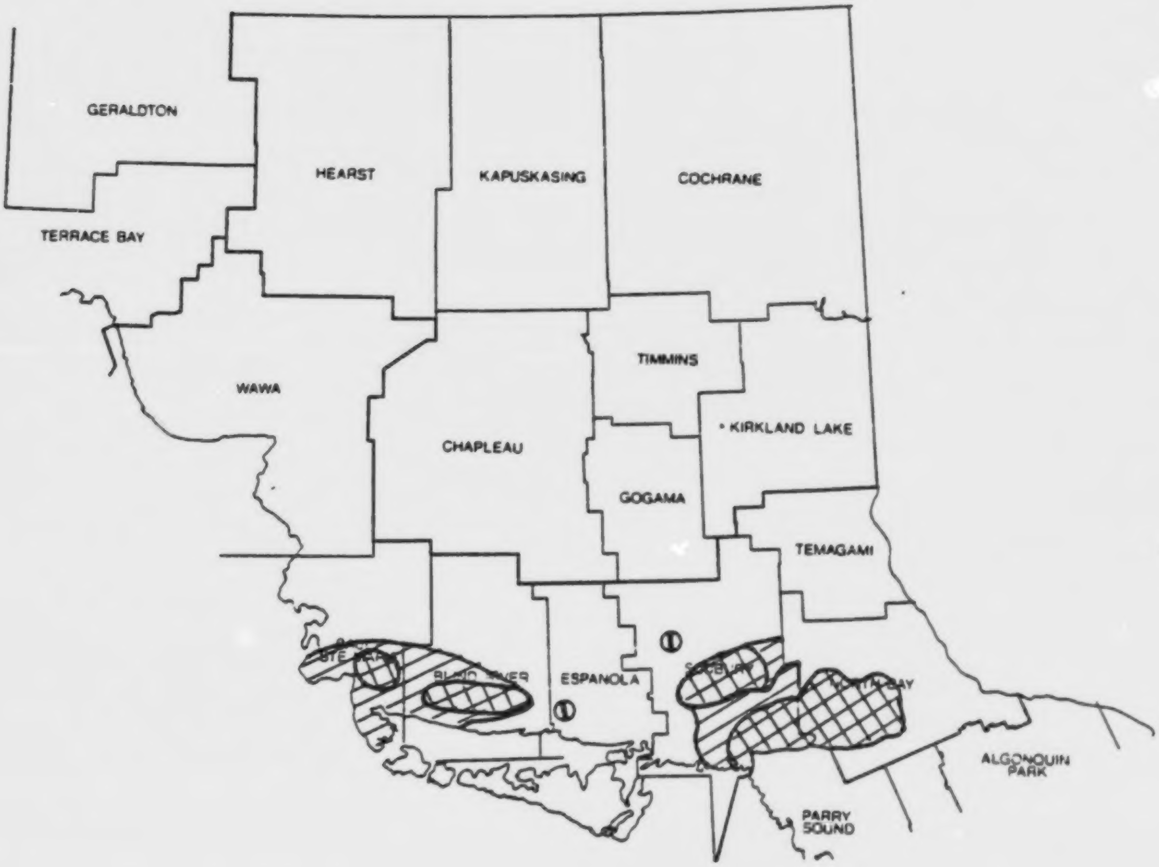
Areas within which defoliation occurred in 1964

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1965

0 Miles 60

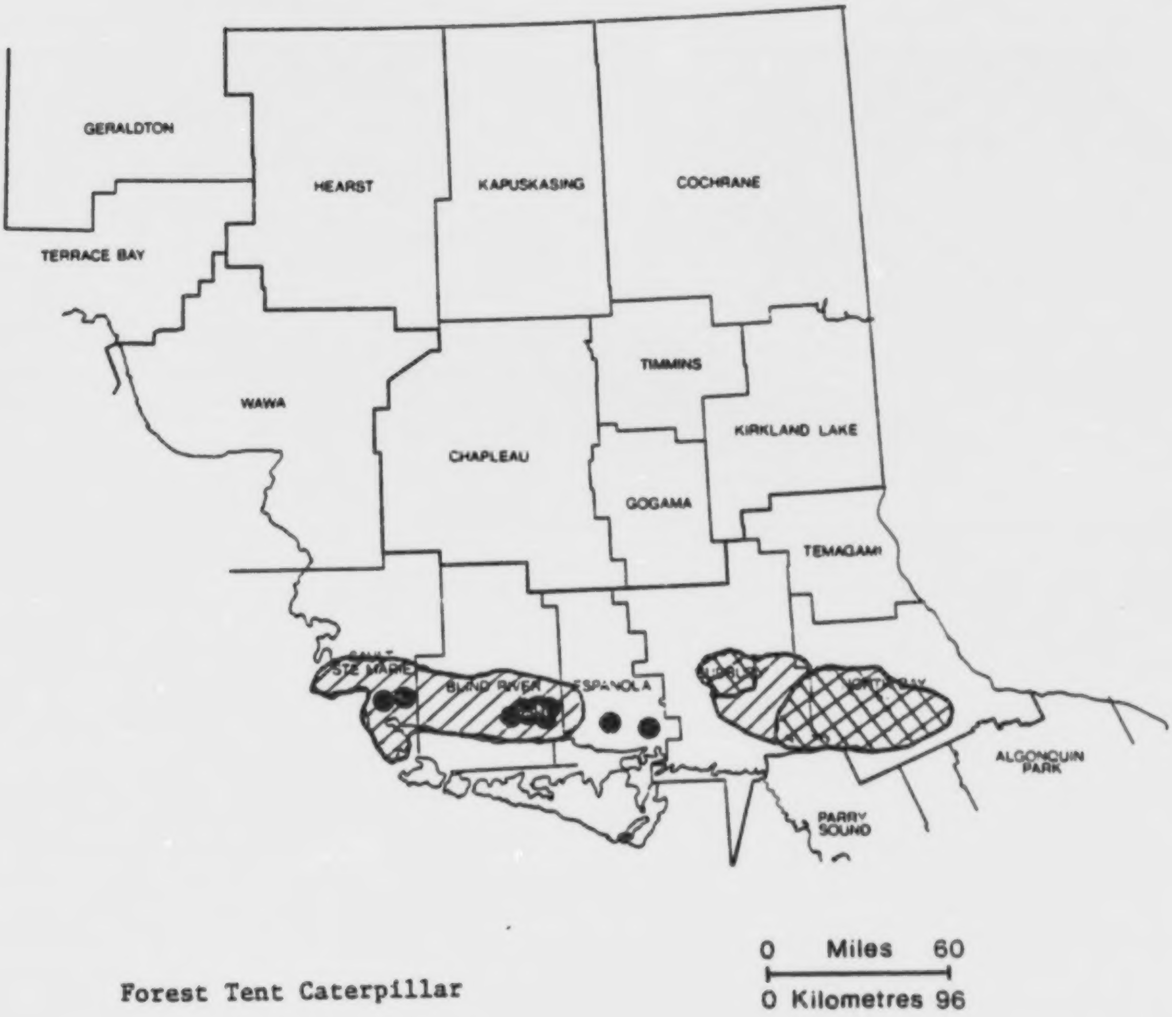
0 Kilometres 96

LEGEND

Light defoliation ① or ▨

Moderate-to-severe defoliation ▩

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

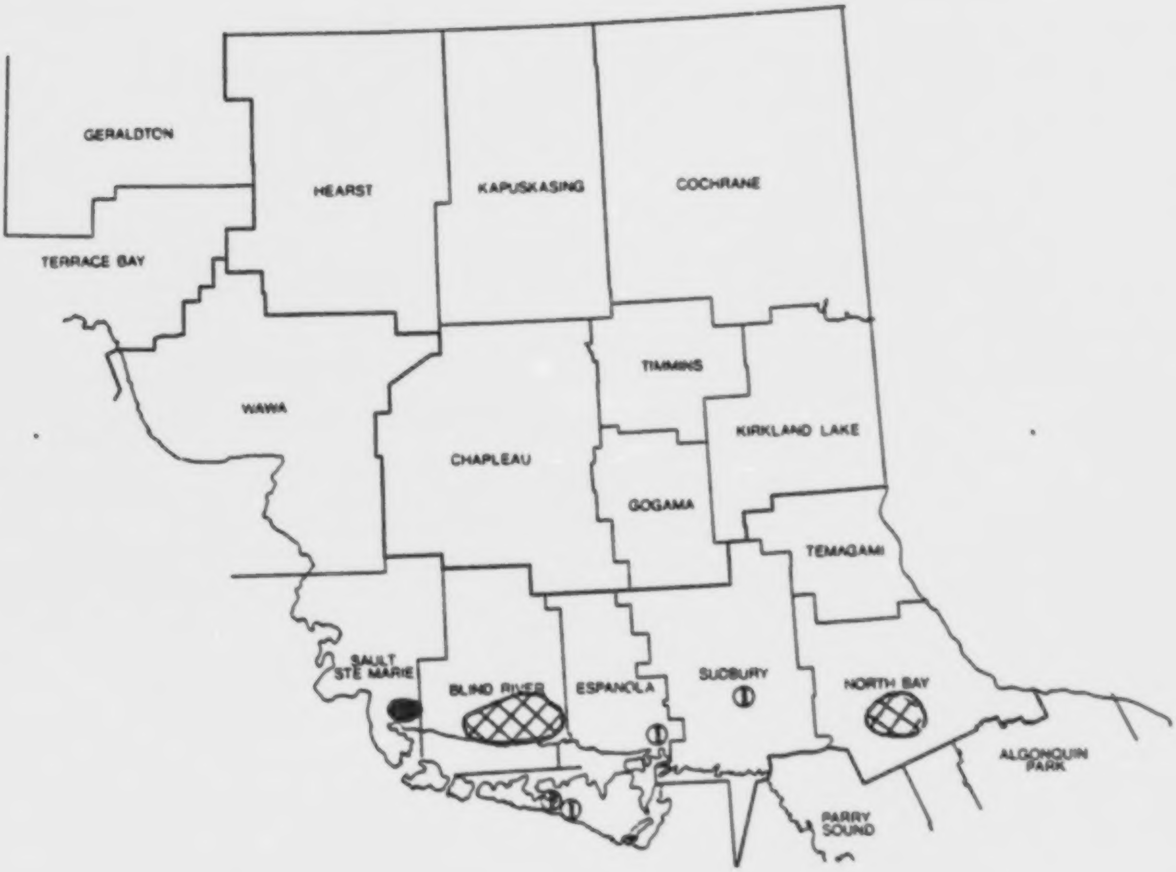
Areas within which defoliation occurred in 1966

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

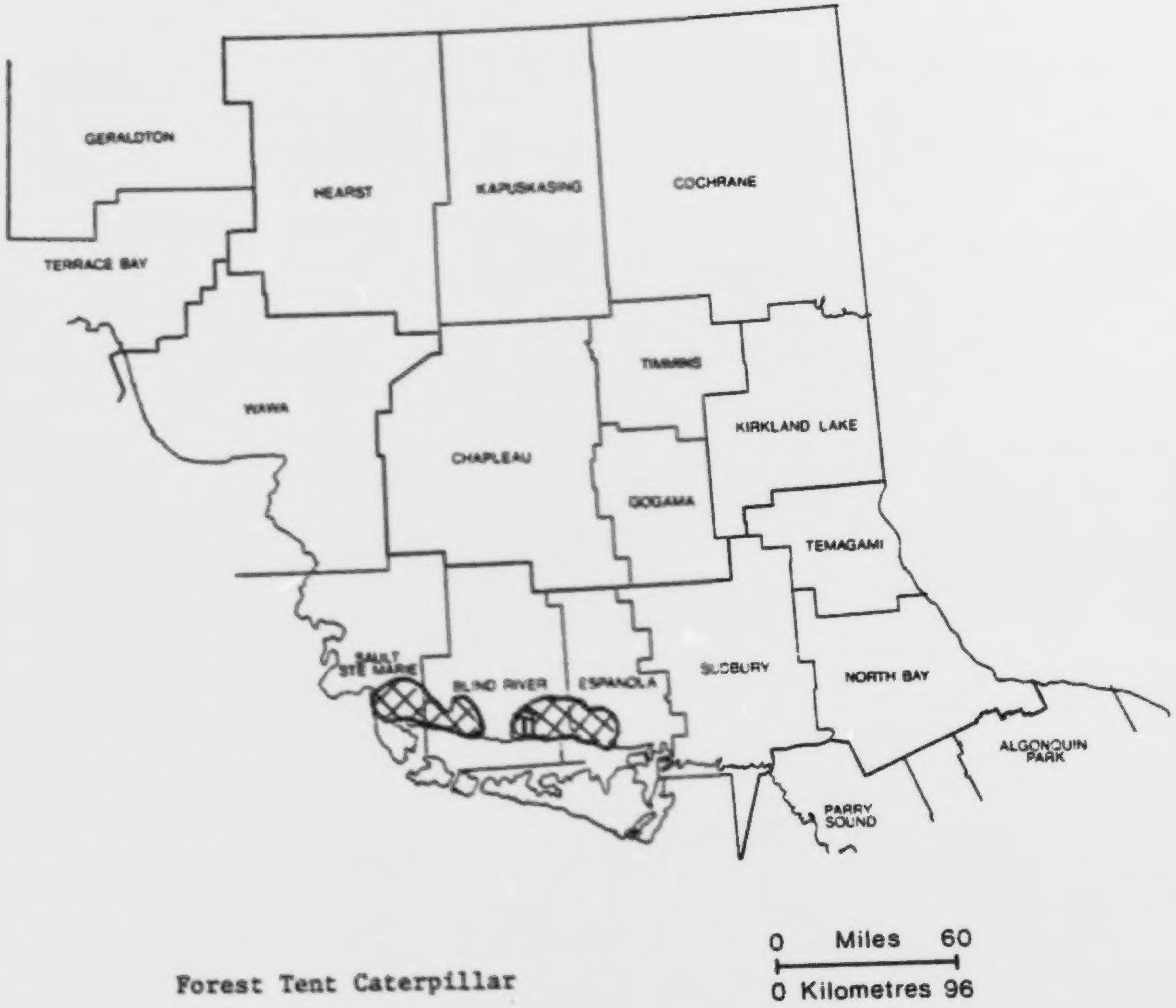
Areas within which defoliaiton
occurred in 1967

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

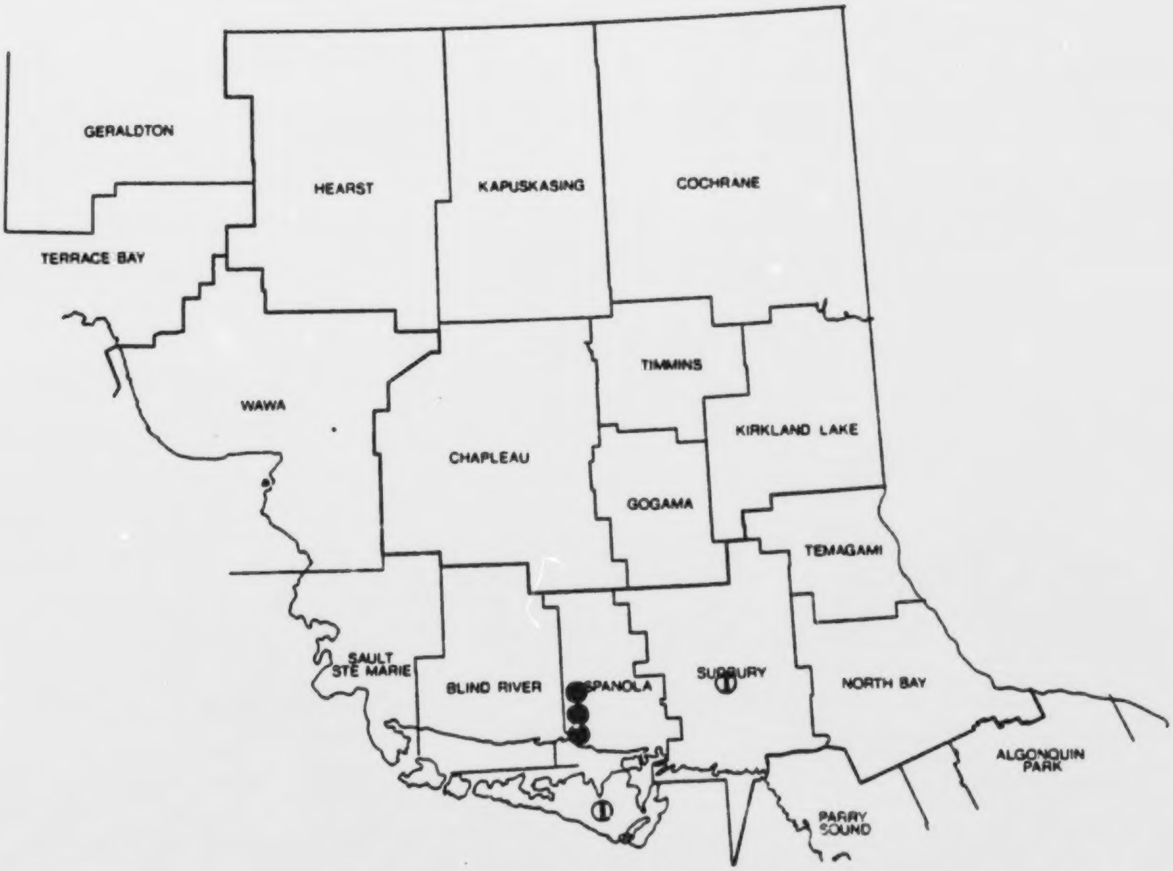
Areas within which defoliation occurred in 1968

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

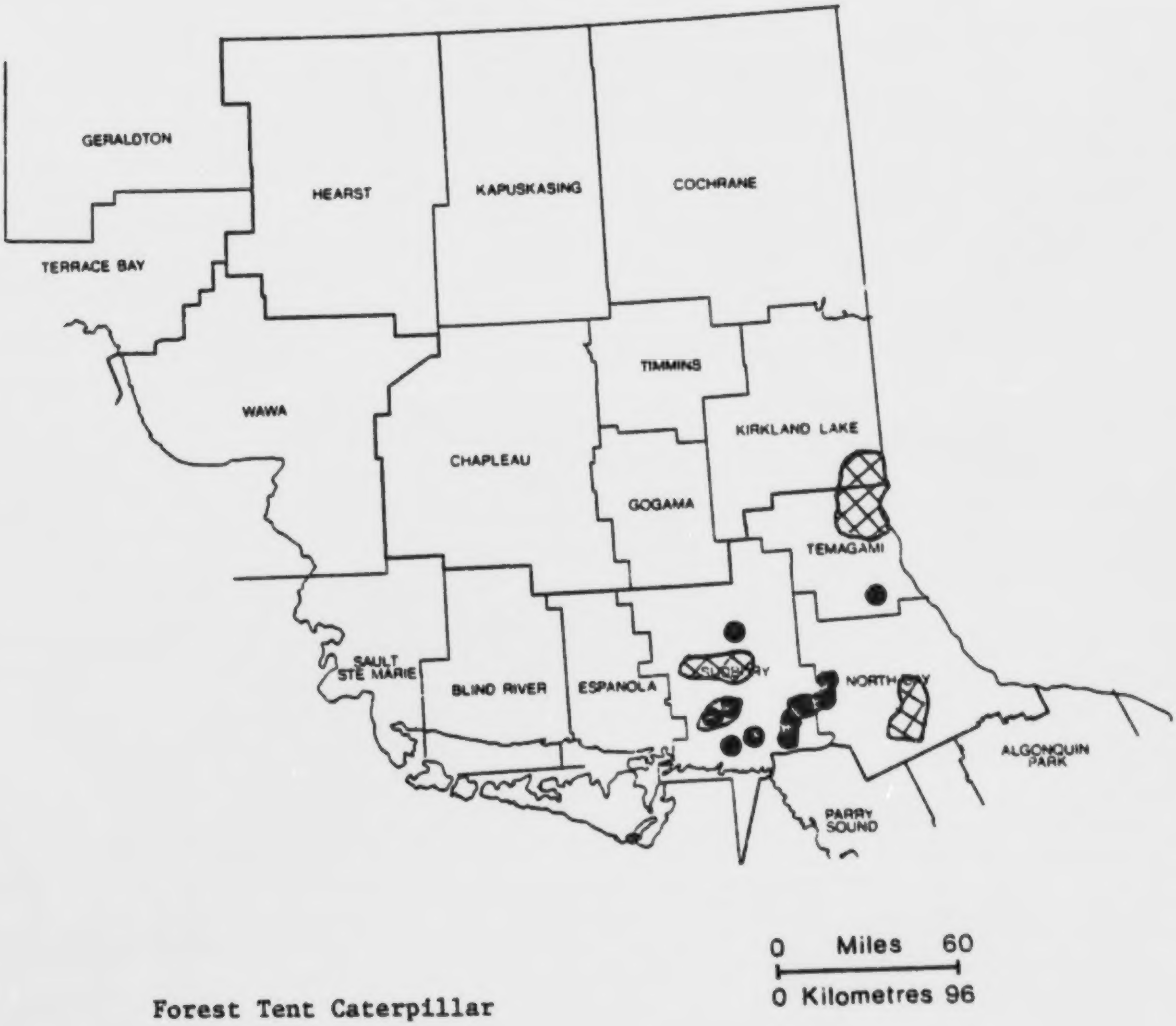
Areas within which defoliation occurred in 1969

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO



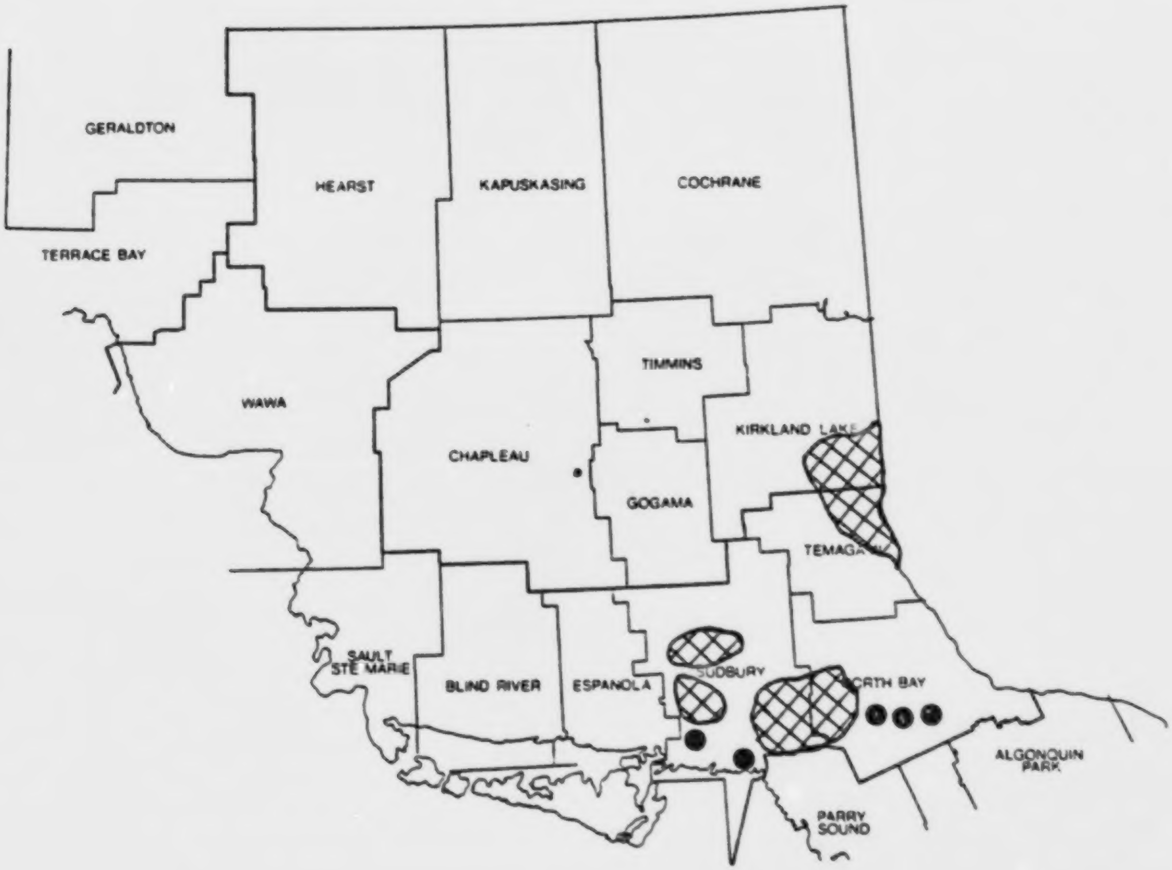
Forest Tent Caterpillar

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



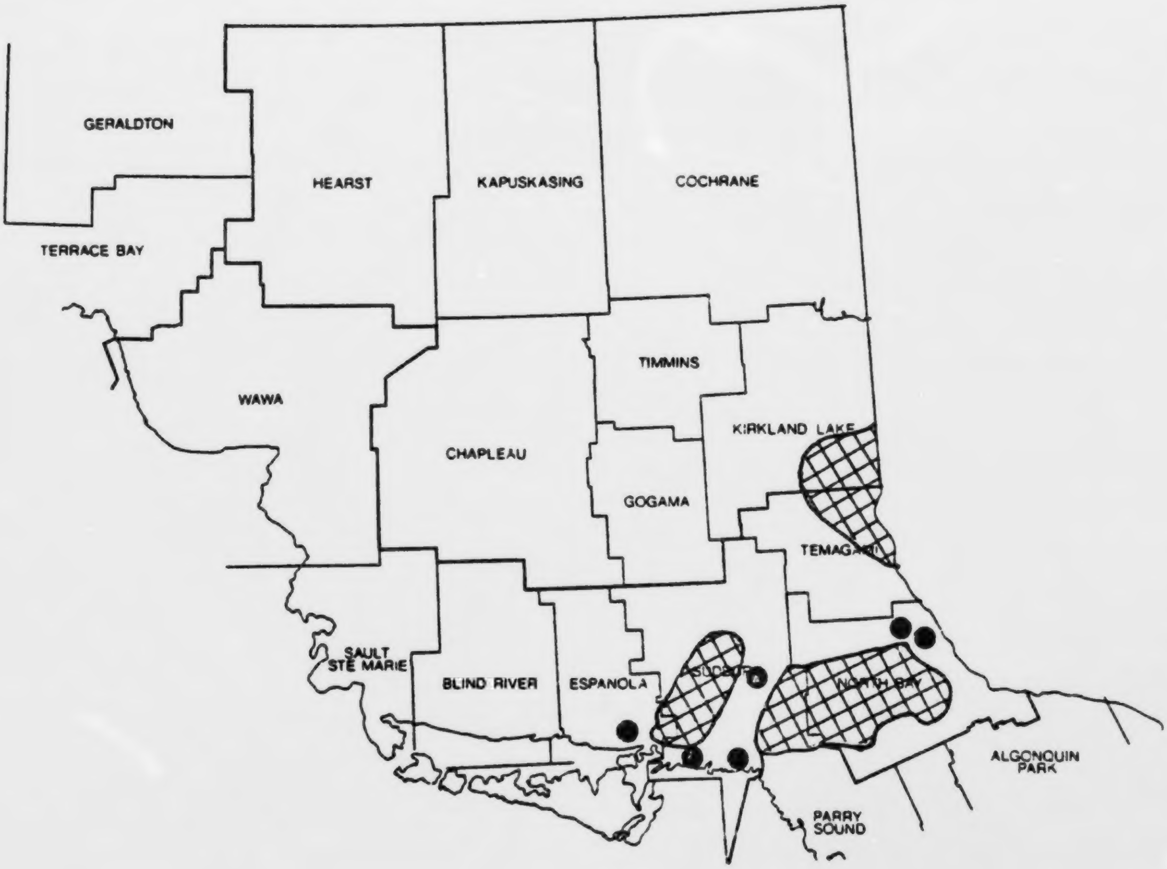
Forest Tent Caterpillar

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



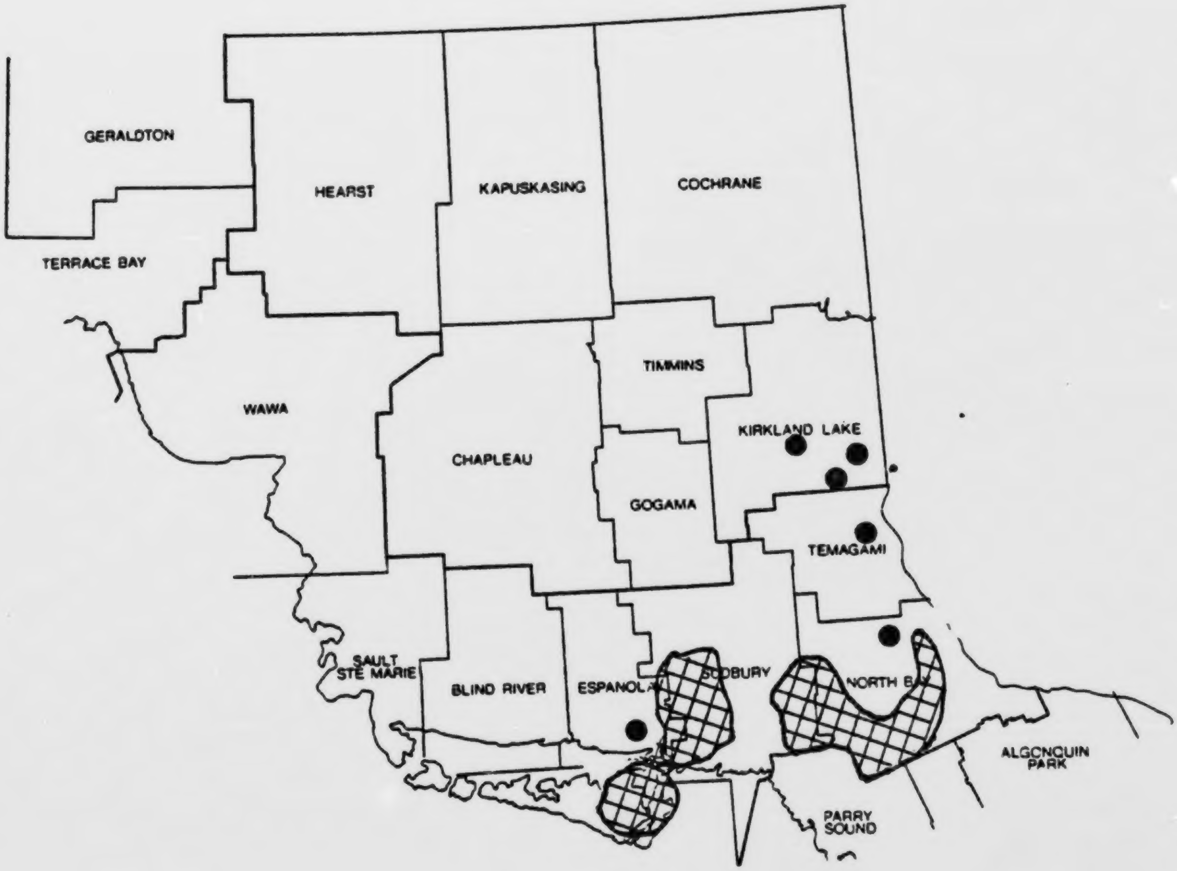
Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



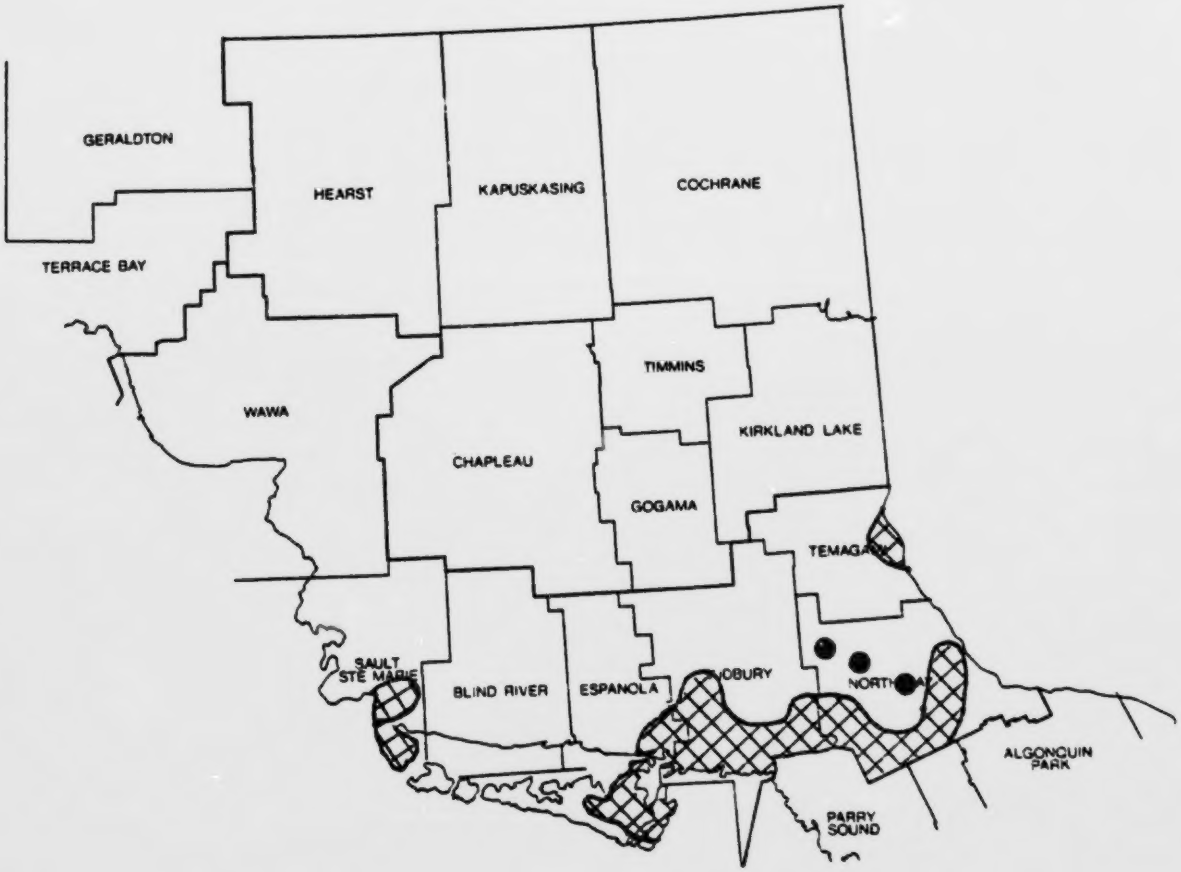
Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



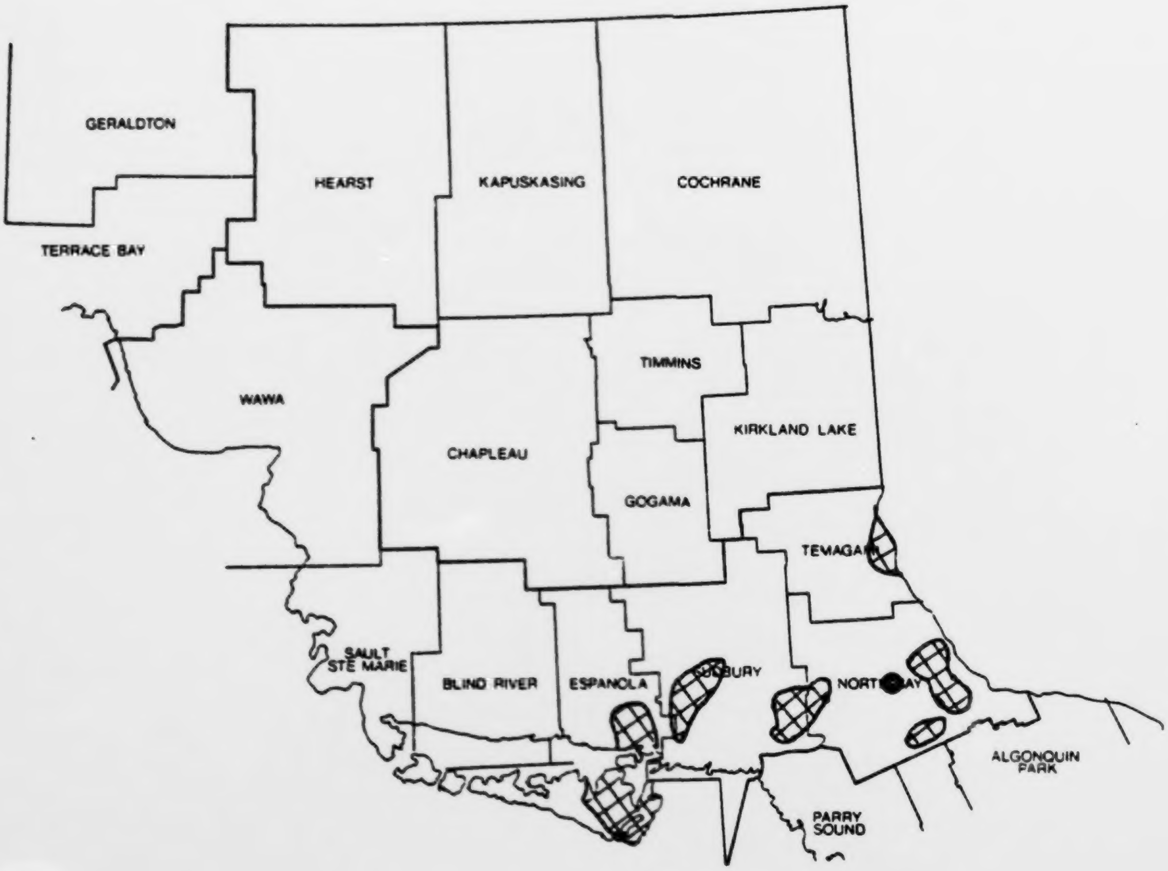
Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60
0 Kilometres 96

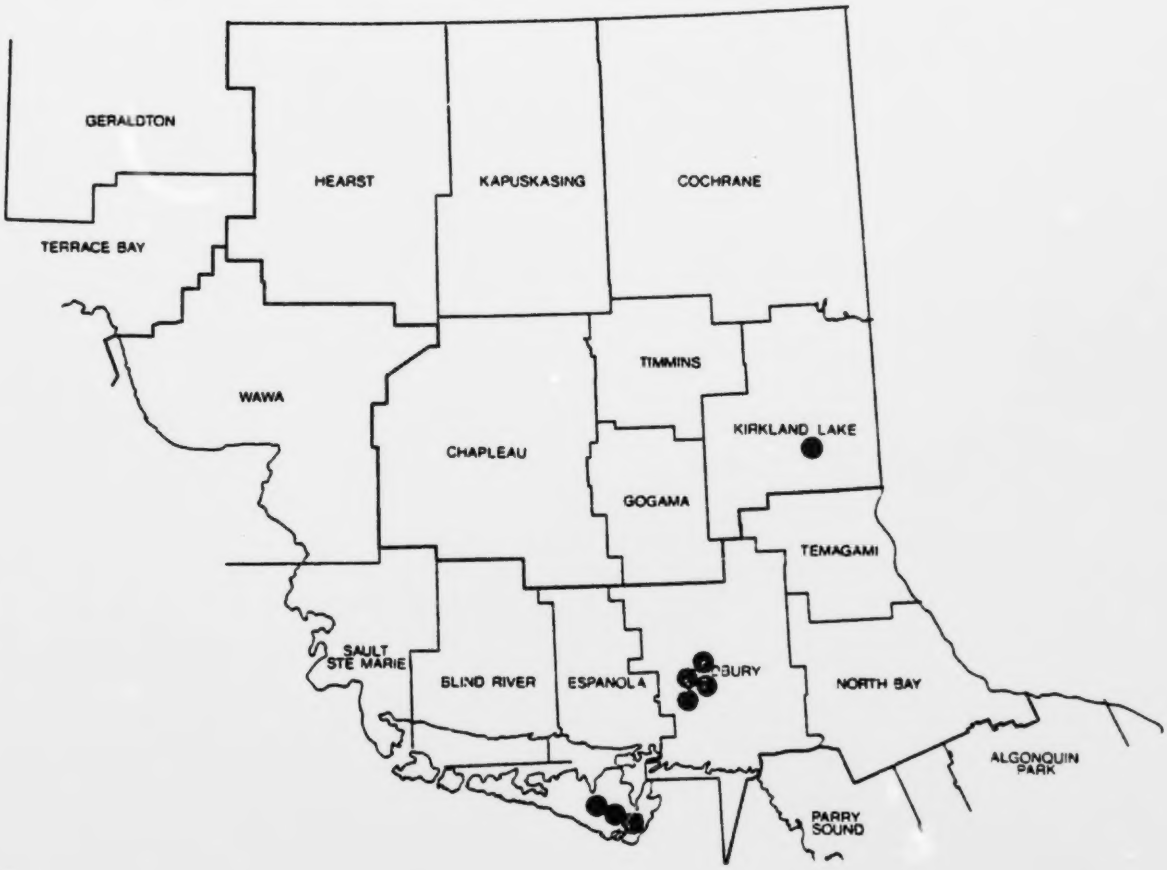
Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

0 Miles 60

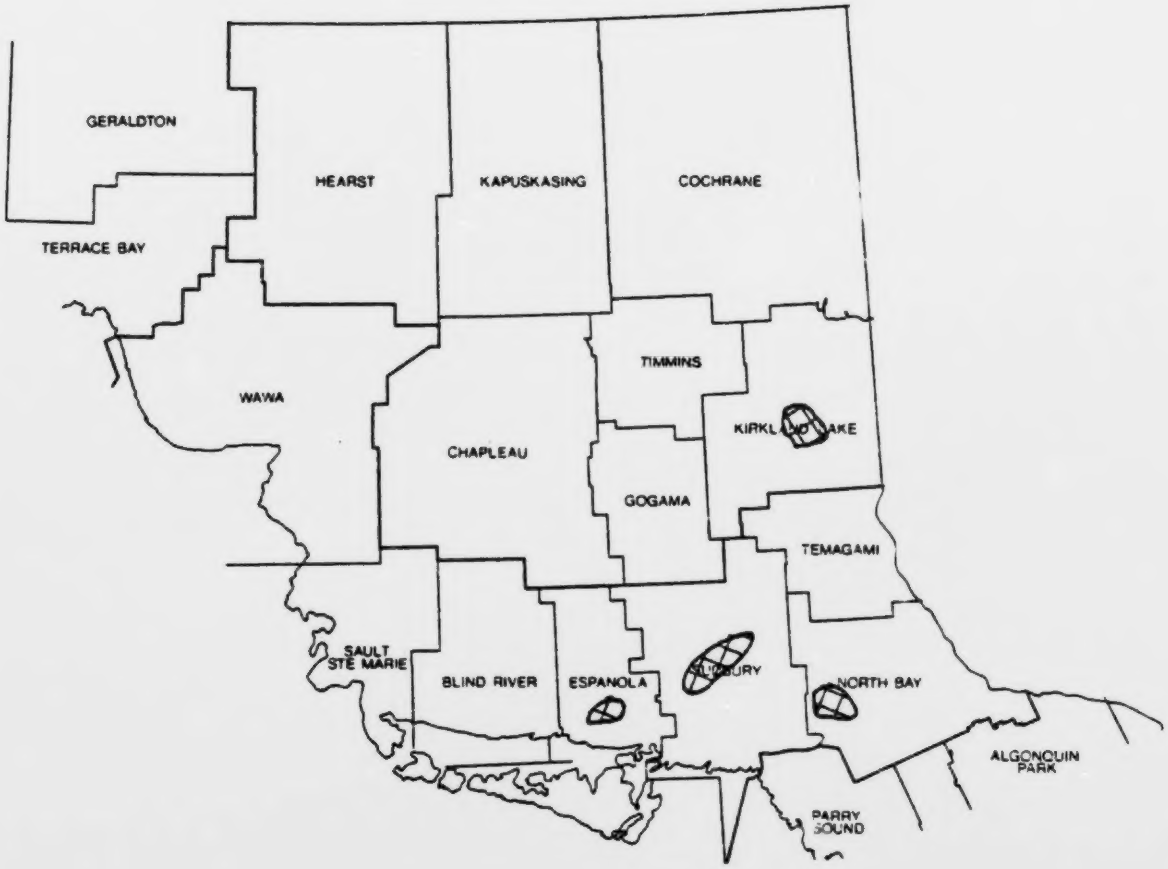
0 Kilometres 96

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO



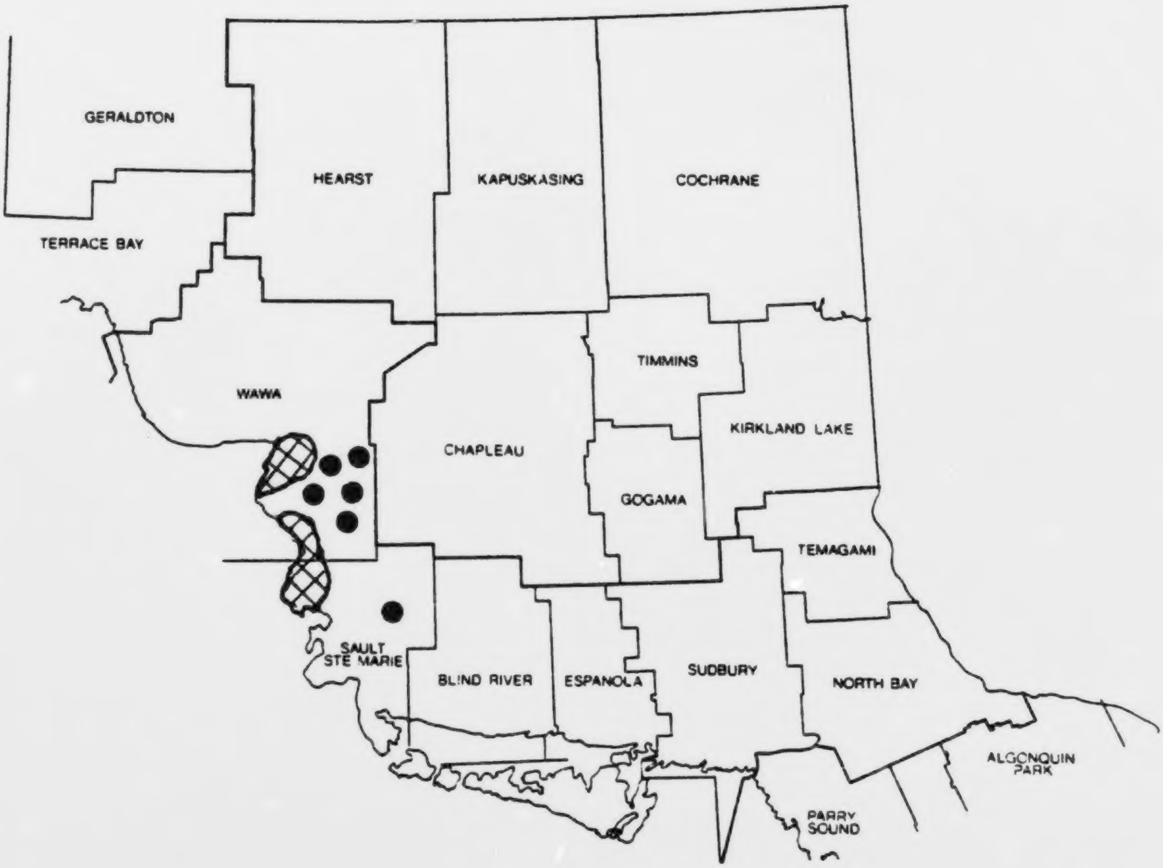
Forest Tent Caterpillar

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO



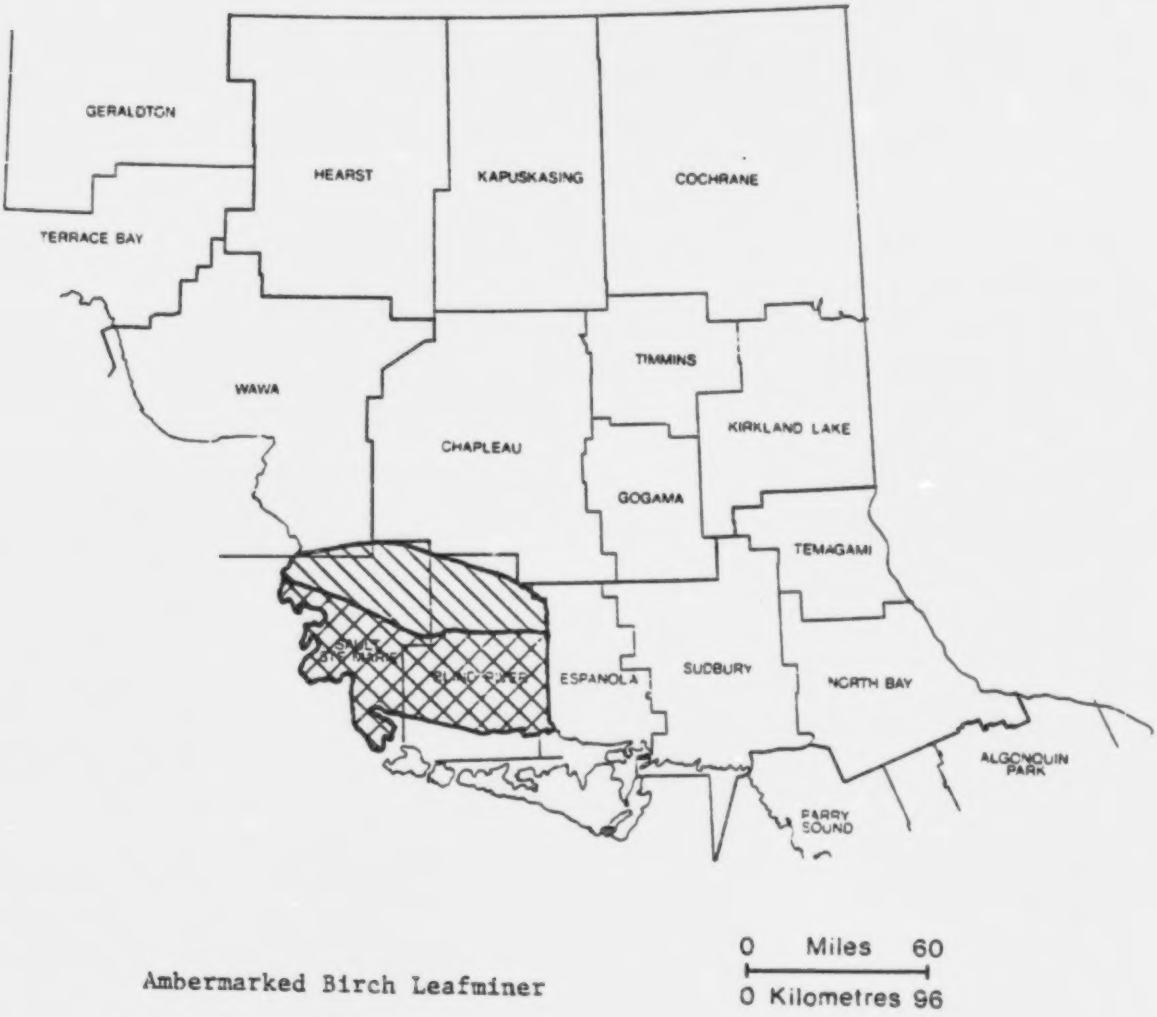
Ambermarked Birch Leafminer

Areas with which defoliation occurred in 1958

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Ambermarked Birch Leafminer

Areas within which defoliation occurred in 1960

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩